PIECE-RATE, PREMIUM AND BONUS

PIECE-RATE, PREMIUM AND BONUS

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/piecератepremium00prosuoft

c
P966p

PIECE-RATE, PREMIUM AND BONUS

UNIVERSITY OF TORONTO LIBRARY

BY

J. E. PROSSER

157895.
22.12.20.

LONDON
WILLIAMS & NORGATE
14 HENRIETTA STREET, COVENT GARDEN, W.C. 2.
1919

e

PREFACE

ALTHOUGH reference is made in this little book to "cutting" of rates and restriction of output, the author does not attempt to apportion the blame for these practices; these pages are simply meant to explain the working of certain methods of payment.

The writer wishes to express his indebtedness to Mr. J. F. Whiteford, Mem. Am. Soc. Mech. Engrs., for the loan of much literature relating to American systems, and to Mr. Maurice Oyston, A.C.I.S., for help with the proofs; also to the Editor of the *Engineering Magazine* (now *Industrial Management*) for copious and valuable information obtained from that magazine for the years 1904–1918; and to the Board of Trade (Labour Department) for their publications relating to wage-systems.

June, 1919.

CONTENTS

CHAP. PAGE

1. TIME-WAGE 1
2. PIECE-WAGE 8
3. HALSEY PREMIUM 28
4. ROWAN PREMIUM 38
5. COST PREMIUM 46
6. DIFFERENTIAL PIECE-RATE . . . 57
7. SCIENTIFIC MANAGEMENT . . . 63
8. EMERSON EFFICIENCY BONUS . . 78
9. FOREMEN'S WAGES 88
10. PROFIT-SHARING. 95

APPENDICES

I. WAGE SYSTEMS COMPARED . . . 109

II. LEVER BROTHERS, LIMITED, CO-PARTNERSHIP SCHEME 116

III. PROFIT-SHARING IN THE UNITED STATES 119

INDEX 121

PIECE-RATE, PREMIUM AND BONUS

CHAPTER I

TIME-WAGE

WHAT is meant when we say that a man's industrial remuneration is on a day-wage or time basis? When we have had some opportunity of observing this method of payment in operation, we realise that a satisfactory definition must take into consideration the amount of work performed.

Although in theory a time-wage is simply a payment for a man's service within a stated period, in practice it will be found that the remuneration is given for a fairly definite amount of work of customary quality and accuracy. The degree of exertion expected is influenced by a number of conditions, *e.g.* an employer would certainly always look for a normal performance but would have more difficulty in obtaining the customary amount of work, if labour in the particular branch of industry concerned were scarce, or if his employees were backed up by a strong combination which sought to place some restriction on output. Again, the work may require a highly-skilled operative, and an employer, in revolt against what he considers an unsatisfactory output, in respect either of quantity or quality, or perhaps both, may find himself unable to discharge unsatisfactory workmen owing to the dearth of men who possess the necessary training and experience.

The employee, too, fully realises that his output must not be under a decent standard. Does not he (rightly) claim "a fair day's wage for a fair day's work" and thus concede the principle of a normal performance for a normal remuneration?

The principle is again to be recognised in the moral contempt in which a "slacker" or "shirker" is held by his fellows.

We have tried to show that the employer who pays time-wage may be hindered by various obstacles in his endeavour to secure a normal output. The case of the employee can be examined in the same light. Under average conditions he will be able to resist the attempt of his master to enforce upon him a more rigorous task than custom sanctions; for he can summon his Union to his aid, or he can leave and obtain employment in a factory where an abnormal amount of work is not required. But suppose that the worker finds himself in an unorganised branch of industry, and suppose, again, that labour suitable for that particular industry is superabundant and cheap. In such conditions the employee would have much difficulty in fighting his employer's demand for an inordinate amount of work.

Thus we see that the time-wage system has certain points in common with the piece-wage system. The chief differences are that in the former system the standard of performance is implied rather than definitely stated, and, since the remuneration is a definite amount per hour, day, or week, there is not the fluctuation in earnings that is associated with the piece-wage system. It may be allowed, too, that wages under piece-work conditions are generally higher than those on a time-wage basis.

Now, if we try to define our time-wage system in such a way as to include the foregoing considerations, we may say:—

By a time-wage system is meant a method of industrial payment that stipulates a definite reward for a service which is not so strictly defined, since it varies in extent with the condition of the labour market and is affected by the strength or weakness of local trade-unionism.

The student will discover many cases in which a time-wage system is connected with a piece-wage basis; *e.g.* the time-wage may be contingent upon a specified output with possibly the threat of dismissal, if the production fall short of the demand. Or an employer may pay a fixed time-rate with a bonus-rate for all output in excess of a standard. But systems of this sort properly come under the category of piece-wage or bonus systems with a guaranteed time-wage.

Few of the industrial remuneration experts can be found to say a good word for the time-wage method. Its greatest fault is deemed to lie in its inability to carry with it any high degree of efficiency. Since men varying in ability, in power of concentration and in habits of industry are given an equal wage, therefore the principle of reward is considered to be unsound and unfair. No incentive is held out to a highly-skilled time-worker who may be capable of producing work in quantity and quality far above the average. Thus the skilled operative becomes indifferent, tends to sink to the average level of performance, and often deliberately represses instincts which, in a more favourable environment, would lead him to become a thoroughly efficient worker.

A further objection to the time-wage method lies in the excessive cost which is a direct result of the relatively small output characteristic of time-work.

It is now recognized, too, that high costs have a strong tendency to depress wages, and that the best way to obtain low costs is to pay high wages for a first-class performance on a piece-work, premium or bonus basis, and to organize the details of manufacture in such a way that the excess in wages paid is far more than balanced by the increased productivity.

Another reason advanced in support of the claim that the time-wage system is very costly is that, under it, the men fear to establish fast times on operations or processes, because they are apprehensive that the quickest recorded time may be used against them as the basis of a low piece-rate, if later it were decided to change the system of payment from time-wage to piece-wage.

Again, the dread of the unpopularity with which a worker finds himself invested, if he lowers the average time occupied on a job, is a factor constantly at work to keep the cost of wages per unit of output at a high level.

Associated, too, with the time-wage system is (in the opinion of many employers) the excessive amount of supervision required to persuade the men, in the absence of any strong incentive, to produce something approaching a reasonable amount of work.

Finally, it is objected that since under the time-wage system payment is made for an amount of work which is not strictly defined, there will consequently be much variation in the cost and, as a result, considerable embarrassment in the mind of the manufacturer who, for his guidance in arranging contracts, is anxious to learn the probable cost of the article he is making.

Although the body of expert opinion is against the time-wage method as an instrument of industrial efficiency, it should not be thought that the system possesses no advantages at all. To begin with, its simplicity is of great value and reduces the cost of clerical labour; again, it is claimed that there is not the same tendency to "scamp" work as under the piece-wage system; but it is asserted, in reply to this charge, that under the other systems of remuneration the question of quality is guarded by a system of close inspection of the product. There is a feeling too, in the labour world at least, that the time-wage system is more conducive to good feeling among the men owing to the absence of the friction that is sometimes developed, when men paid by the "piece" are tempted to over-reach one another in the effort to secure the maximum of work.

But in cases where the operations are of a nature that the work cannot be judged in such a way as to allocate blame for defective quality to the proper quarter; where it is necessary to have exquisite workmanship; where it is extremely difficult to calculate the output; or where a workman is engaged on repair jobs; unless the probable time can be estimated or the repair jobs standardised, as *e.g.* in repairing boots and shoes; in these cases the time-wage method still appears to have its place.

The writer ventures to think that the possibilities of efficiency under the time-wage system are not yet exhausted. It is in the main due to the view that time-wage is only a preparation for piece-wage that the former system has not always been utilized by the employees in the best way. If the workers could be convinced that they would not be penalised for good records by a low piece-rate which has been based on those records (and the history of industrial remuneration goes some way to justify the fear), in short, if the time-rates were guaranteed to run permanently or at any rate for a term of years without interference, the first step would have been taken to make the time-wage system approximate to a scientific method of remuneration. If, further, the workers were to abandon the unscientific demand for a uniform payment for unequal work, then another advance would have been made towards the goal of a satisfactory method; for surely it is more sound in principle to establish time-wage ratings that shall vary with the ability, experience, and industry of the individual.

The conditions under which the work is done also vary greatly in many cases, and a time-rate which may be an adequate reward in a normal environment may be quite inadequate under conditions that are specially unpleasant, obnoxious, or that entail much more than a normal performance to produce the unit. Unless in these cases the employer grants an increased rate, the net effect, as recognised by economists, is to reduce the "standard rate" of payment.

Again, the introduction of new machinery may result in increased effort and responsibility on the part of the time-worker and should be accompanied by a commensurate increase in the time-rate.

Also, if under the time-wage system methods existed by which at short intervals there were given, in respect of output and quality, rewards based on individual performances and so graduated that even a slight improvement would be reflected in the wages, the necessary incentive would perhaps be supplied, and the simplicity of the time-wage system would to some extent be united with the stimulus of a piece-wage or bonus system.

Another improvement may lie in using modifications of the old "time-task" or "stint" system which stipulated a definite output per day.

Again, in the case of a day's work containing a large number of dissimilar tasks or miscellaneous duties, it could be stipulated that a group of jobs, or the performance of a specified list of duties, duly inspected and certified on completion, should constitute the day's work. There should be a preliminary instruction and training of the men in the best methods of working, and a continuous flow of work should be planned. Also, for the sake of fixing time-rates in relation to efficiency, there should be kept a careful record of individual performances. The introduction of these methods would, of course, carry an increased time-wage, the amount of which would vary with the difficulty of the tasks but would be sufficient to furnish that stimulus which is commonly held to be non-existent under the time-wage system. As an additional incentive, in exceptional cases where despatch is of the first importance, when the day's task is done, the individual or gang (for the principle can equally well be applied in either case) should be allowed to leave the factory, as was permitted under the "stint" system. This latter modification would be suitable only where the use of machines is not involved; for no system should be tolerated that does not attempt to use machinery to its fullest capacity.

CHAPTER II

PIECE-WAGE

Under the "piece-wage" system of payment the wage paid is for a definite amount of work, of ordinary quality, and done under customary conditions, with theoretically no relation to the time occupied in its performance. But, in practice, just as the time-wage implies some "piece" basis, however indefinite, so the piece-wage implies a "time" basis; *e.g.* the employer, in fixing a piece-rate, has largely been guided by his estimate of the operative's probable earnings per hour, day, or week. The time-basis is, however, being criticised, and in some instances abandoned by experts, by whom it is becoming accepted as an axiom that the criterion of a wage system is its possibilities in the direction of increasing production and lowering costs. High wages, as such, are not in future going to alarm the manufacturer so much as they did in the past. The employer is beginning to learn that a corollary of efficiency is a considerably increased wage, and that a low remuneration is costly.

The piece-wage system is held to be a fairer method of remuneration than the "time-wage" because of its recognition of the varying standards of performance. The industrious man is rewarded in exact ratio to his increased effort, and the indolent worker is penalised to the extent by which his output is lower than that which is customary. This system, too, has the advantage of indicating the capable men, and enabling the employer more nicely to judge their comparative abilities and qualifications.

It is generally held that a piece-wage results in a larger output than that which follows a time-wage. The main cause of this lies in the incentive now brought into action. The incentive is direct and under normal conditions usually meets with response. The employer finds his reward in a decreased cost, because his "overhead" charges, such as manufacturing expenses, rent, rates, taxes, etc., being distributed over a larger output, affect in turn the cost per unit.

The keener concentration of men working under piece-wage tends, too (it is sometimes claimed), to improve the quality of work, while the employee, finding that faulty work is reflected in his weekly earnings, more carefully scrutinises his raw material for flaws and helps the employer in his endeavour to reduce excessive waste at its source.

Again, the desire to increase the output causes the workman to regard his methods and motions critically, raises his efficiency as a skilled worker, and leads him in many cases to devise short cuts.

In addition to a reduction in cost, the employer has the satisfaction of creating a fixed figure for the cost of labour. To know this figure is an invaluable guide to the manufacturer in making his quotations, particularly if competition in his trade be keen, or if sometimes in his efforts to secure important contracts he is anxious to learn the lowest figure at which he can sell and yet retain a satisfactory margin as profit. But a word of caution is necessary here. If an operative were at work solely on one particular operation, it might be safe to take the piece-rate for that operation as a basis for cost calculations. On the other hand, if the work were varied and involved several piece-rates, it would rarely be safe to take those piece-rates as the basis for cost figures: to do so would imply that all the piece-rates had been accurately fixed. Where possible, it would be found wiser to obtain the actual cost figures through an analysis of time-records, presuming the latter are shown in detail, and to compare the figures obtained in this way with the piece-rates. The results of such comparison so frequently show that piece-rates do not closely correspond with the actual cost figures, that cost accountants, preferring to rely upon the analysis of time, are beginning to reject the piece-rate as a basis.

The piece-wage system is usually regarded as a simple one. Looked at from the point of view of the accountant, that may be so, once the piece-rate has been fixed; but it must be remembered that if rate-fixing is done in anything like an efficient way, and if it is to be of permanent value, it must be preceded by a series of careful calculations and tests.

Various methods, of widely differing degrees of accuracy, are used in determining piece-rates. A common method is to take the foreman's estimate of the time required, and to use that as a basis. Another method lies in studying time-records relating to the process or job and determining a reasonable time-basis therefrom. Or, again, a special observation may be made and the time carefully noted and compared with the time obtained by one or both of the methods mentioned above, with the purpose of discovering the most rational time-basis. It sometimes happens that the "fastest" and not the average time is taken as the basis. Such a practice has been the cause of endless disputes and conflicts in the labour world. It cannot be defended, because this method often ignores the conditions under which the work has been performed. The conditions that have combined to make the record the "fastest time" may be quite abnormal, *e.g.* there may have been a good stock of material at hand, a plentiful supply of suitable tools, a machine in excellent condition, and gear in first-class order. Again, the quickest worker may be of exceptional physique, and it is unreasonable to expect a normal worker to injure himself in the effort to perform what for him is an impossible task. The taking of the "fastest time" as basis cannot be justified, unless the conditions under which the test was recorded are conditions which the employer is prepared to maintain permanently. We approach such an undertaking on the part of the employer under what is popularly called "Scientific Management," which will be discussed in a later chapter. More rarely standard piece-rates are fixed as the result of collective bargaining; by joint committees, or by employers on the one side and on the other by Trade Union officials who are practical experts in the particular branch of industry. There is the difficulty here that conditions and facilities vary much as between various factories. So far as this difficulty may be overcome, and not overlooking the fact that collective bargaining may entail considerable delay, it is hoped by many that the latter method will come into extensive use. Advocates of collective bargaining allege that, apart from the fact that it abolishes arbitrary rate-fixing on the part of the employer, it is the only system of arranging rates that promises a lasting harmony in the industrial world.

Before passing on to consider the more general aspects of the piece-wage system, it may be useful to repeat that the piece-rate, in practice, is not without a time basis. Few employers would fix a piece-rate without having in mind the probable earnings of the piece-worker, and the attempt would be made to fix rates that would not produce an excessive wage. For example, the employer might try to arrange a piece-rate which in the hands of an industrious and skilled operative would probably increase the normal time-wage by 25 per cent. or 50 per cent.: to use a common phrase, he would fix the rate at "time and a quarter" or at "time and a half."

The reader will note that the methods of rate-fixing described above assume that no revolutionary improvement is possible on the time considered reasonable for the job.

It has been pointed out again and again, particularly by American writers, that the possibilities of performance as the result of special training are usually altogether overlooked.

Where such training is undertaken the usual methods are completely abandoned, and a rate is fixed which is remunerative (and highly remunerative) only to a specially trained operative, working closely to instructions and under favourable conditions in respect of tools, gear, and machinery. For a more detailed discussion of this aspect of rate-fixing the reader is again referred to the chapter on "Scientific Management."

Whatever be the method adopted, the importance of avoiding error in the first calculations can scarcely be exaggerated. Rates hastily fixed are rarely accurate. On the work of rate-fixing should be brought to bear as much patient study as is applied to any other problem in industrial remuneration; for, if the rate be either too high or too low, there are developments which inevitably bring trouble in their train and are sometimes the cause of far-reaching disaster.

If piece-work be done in overtime, the question arises whether, on account of the additional physical strain involved, it does not then deserve a higher remuneration than the normal piece-wage. Occasionally a higher piece-rate is paid for work done after normal hours, or the normal piece-rate may be used together with a special time-rate for each hour worked in overtime. Or, again, if it is known beforehand that there is to be continuous overtime on a job, a specially high piece-rate may be fixed to apply uniformly to the normal working day and to overtime.

Piece-rates are affected by improvements in tools and machinery, enhanced facilities, and a more thorough organisation. It is only just that, as the result of one or more of these innovations, the piece-rate should be revised. In practice, the rate generally is not adjusted exactly in ratio to the estimated reduction in time under the new conditions; the workman is usually given a share in the advantage. Rarely, indeed, would it be just, if the employer reaped the full benefit of a change of this nature; for the operative's responsibility is usually increased as the result of the new conditions, *e.g.* he may be required to attend to three machines instead of two, or the new machines being more complex may require on the part of the operative a larger measure of care and skill. On the other hand, it would be unfair that the employees should gain the whole of the advantage; for they are indebted to the employers for the improved organisation or increased facilities which make it possible for them to earn a higher wage; besides, the improvements frequently entail a considerable expense.

One of the greatest disadvantages of the piece-wage system consists in the difficulty of finding a record sufficiently accurate to form the basis of a permanent piece-rate. It is being recognized more and more how difficult the problem of rate-fixing really is, and increased attention is being paid to the task of finding a time-basis in a scientific way. The old rule-of-thumb methods that have resulted in so much trouble in the past are falling into disuse. There still remains, however, the problem of finding a standard time in cases where the work to be performed involves difficult operations the extent of which cannot easily be foreseen, or where the work is unusual and outside the experience of the employers, or, again, where the conditions under which the work is done are variable. In such cases as these it is advisable to use the Halsey premium system, which gives the employees a portion of the saving on standard time, and thus lessens the effect of any big errors in the calculation of the standard.

To come now to those cases in which the piece-wage system is generally held to be most suitable, *e.g.* in repetition work of a nature which presents no special difficulties and which is well within the experience of employers and employed, we find that the piece-workers frequently suffer through no fault of their own. The machinery may be poor, castings faulty, or defective organisation may cause long delays and stoppages. It is quite clear that, if the employer accepts the responsibility of a piece-wage system, he should see that the workman is not kept waiting for material, and that tools, machines, gearing, etc., are maintained in proper condition.

It is commonly alleged that the piece-wage system carries with it an inferior workmanship. There certainly is a tendency among men of low moral to "scamp" work, as there is an inclination to "sweat" the men on the part of employers of an equally low ethical standard. If, however, a factory is properly organised, the matter of quality is guarded by a rigid inspection, whatever may be the particular wage-system in operation. An improving moral standard on the part of the employee is at work, too, in minimising the extent of a fault that was at one time rather prevalent.

There is a possibility under the piece-wage system of the learner coming off very badly, if, during the period of instruction, he is paid at a piece-rate which is remunerative only to an experienced operative. In a case of this sort it is the practice of some employers to pay time-wage, until the new man has gained experience normally sufficient to enable him to earn, as a piece-worker, at least the equivalent of a time-wage. All employers, however, are not so considerate, and there is considerable hardship in individual cases through the strict enforcement of piece-rates with no allowance during the period of learning. On the other hand there are many employers who guarantee that piece-wage earnings shall be at least equal to the time-wage, whether the employee be a novice or an experienced worker.

A fundamental objection to the piece-wage system, as stated by the workmen, is that as a rule the piece-rate is fixed arbitrarily by the employer. The transition from time-wage to piece-wage has frequently carried with it the change from collective to individual bargaining, often to the disadvantage of the employee. The workers would be well advised to stick to the principle of collective bargaining, which has won for them the standard time-wage. To give one instance, employees in the cotton industry have adopted this principle with great advantage to themselves. Without collective bargaining there is ultimately the danger, under individual contracts, of men having to work with an exertion characteristic of piece-wage for a wage that may be less even than their old standard time-wage.

Another objection, strongly urged by many, relates to the persistent reduction in rates, or, to use the familiar term—"cutting"—under circumstances which do not justify an alteration in rate. The reduction may be effected in an arbitrary way and is (so it is stated) usually introduced when it is discovered that the men's earnings exceed a figure which, in the opinion of the employer, is the desirable maximum. Thus the workman is often penalised exactly in ratio to his extra effort, and this punishment, be it noted, takes place at both ends of the scale. At the one end he is punished for doing too much by having his rate reduced, or he is punished in the injury and strain caused by the endeavour to work still harder in order to obtain the same wages; at the other end he is punished for doing too little by being paid strictly for his output, however small it may be. Now, the effect of "cutting," in cases where there is no reason for interference with the rate and where the reduction simply reflects an employer's deliberate intention to lower the original standard wage, is thoroughly demoralising, and after the second "cut" the men are disheartened. They then are tempted to make an effort to discover the exact figure they will be allowed to earn without rendering themselves liable to a reduction, and when this figure is ascertained, as the men think, there is a strong tendency to restrict the output sufficiently to keep the piece-wage earnings within the limit which the men have fixed for themselves. If the men succumb to this temptation, then at once the efficiency of the shop is lowered and the cost of production is raised, since the manufacturing expenses and standing charges are distributed over a decreased output.

On the other hand the employees will sometimes accuse their employer of "cutting" where there is no arbitrary reduction, but simply an honest adjustment in the rate because of improvements in machinery or facilities, an alteration in method of manufacture, or some innovation, provided at the expense of the employer, which makes it easier for the employees to earn their piece-money.

Another factor at work in the direction of a curtailed output is sometimes to be found in the influence of the less competent men, who fear that a high average standard of effort will be fatal to their security and try to persuade their shop-mates to restrict their efforts. To counteract this tendency some employers determine what they deem a reasonable standard of output, and stipulate that under normal conditions employees shall either attain this standard or be transferred to other positions.

But perhaps the best way to obviate the evils associated with "cutting" is to fix the rates permanently, or, if this be not possible, to guarantee that the rates shall not be interfered with for a long period. In this way the employees will be convinced of their employer's trustworthiness and the peculiar advantages of the piece-wage system be secured, without the accompaniment of the well-known evil of deliberate restriction of output.

Yet another remedy can be applied. When a list of new piece-rates is published, why should there not be attached to it a scale of discounts indicating that, beyond a stated high figure, earnings would be subject to deductions varying with the amounts by which the figure named was exceeded? Thus the advantage of a too generous piece-rate would not be secured wholly by the employee, and at the same time the employee would find that an increasing output would inevitably produce a progressive wage, not in exact ratio to output, it is true, but in a proportion ample enough to justify a whole-hearted effort on his part.

On the whole it is recognized that the piece-wage system has been a valuable agent in the evolution of industry; and its worth can be further enhanced, if employer and employee alike admit the mistakes of the past and resolve in the future, on the one side not to be frightened by high wages, and on the other not wilfully to hinder the evolution of industry by calculated curtailment of output or by neglect to use tools and machinery in the best way. High wages ought not to alarm the employer, if they are accompanied by decreasing costs.

Hitherto we have discussed the use of the piece-wage system as applied to the individual. But, owing to the difficulty in some branches of industry of calculating the individual output, and the impossibility, in *e.g.* a series of linked-up processes, of judging the individual effort, it is a common practice to adopt the collective principle and fix piece-rates for groups or "gangs," the members of which share the piece-wage in certain predetermined ratios. The men may take equal shares; or they may participate on a differentiated basis which has regard to varying experience and skill; or perhaps, they may receive shares in proportion to their time-rate. Now there are some compensations in the collective or group system which are not without value in the eyes of the employer. The recognition by the members of the group of a common interest brings about a mutual supervision which carries with it a certain degree of efficiency. There is an implicit standard of effort, and the individual who falls below that standard finds his lot an unpleasant one. The mutual interest creates an atmosphere of harmony and unselfishness which is more difficult to establish among a company of individual piece-workers. Also, we have here an opportunity for collective bargaining—for a group it is true, but even a small group can arrange better terms than can an individual.

But the group as compared with the individual is inefficient and costly, because only rarely is it possible to fix each individual's share with justice and yet give general satisfaction; and as it is extremely difficult to apply the same degree of incentive to a group as to an individual, it frequently happens that the individual piece-worker, transferred to a group, works with diminished energy and enthusiasm. It must be remembered, too, that in the group the individual cannot easily compute his hourly or daily earnings, and he cannot so readily calculate the effect, as reflected in his wages, of a spurt or of a carefully planned day's work.

There are numerous modifications of the piece-wage system in use. Some of these are nominally time-wage systems; but virtually, in so far as they stipulate a definite performance, they come under the category of piece-wage systems. Such a modification is to be seen in a case where a man is paid, say 5s. per day, but with the reservation that his daily wage will be proportionately reduced if he turns out less than three gross of taps per day. Instances have been known of men being compelled to produce a specified number of units within a stated time, but however much the output exceeded the number stipulated, the employer did not hold himself bound to pay more than the time-rate. Another variant is to be seen in a system which pays a straight piece-rate, but which guarantees a standard time-wage. Here we have an excellent principle, because the onus of providing a good flow of work and suitable implements is thrown on the employer, while the employee is delivered from the dread (all too frequent in the piece-wage world) that a badly organised service or inferior machinery may at any time detract from his efforts and leave him at the end of the week with a miserably low wage.

The guaranteed time-rate is sometimes used with group or "gang" piece-wage. In this case it is not uncommon to allot the balance of earnings (after the time-wages of the individuals composing the group have been deducted) in predetermined ratios, having bases of sharing similar to those employed in collective piece-work, *i.e.* the balance may be divided equally, or allotted in proportion to the time-rate, or distributed with a regard to individual effort, skill, and experience.

Further modifications are made, when it is sought to stimulate the output and at the same time achieve some other desirable result. For example, if a manufacturer found that the piece-wage system did really stimulate output but that the increased production was accompanied by excessive waste in raw material, he might well be induced to try the effect of a differential piece-rate—a sliding scale, increasing or decreasing according to the percentage of fall or rise in waste. Or again, in cases where a very high degree of accuracy in the finished product is essential, or where it is difficult to judge the quality of the product as it goes through a series of processes, it may be found advantageous to pay higher piece-rates or an added bonus, for a finished product which satisfies the employer's exacting requirements.

A frequent cause of friction arising from the use of piece-rates is the misunderstanding on the part of the employees as to the extent and nature of the work to be performed. To make the requirements quite clear, it is advisable to issue with every new piece-rate a detailed and precise specification of all operations or processes covered by that rate.

It is wise, too, so far as is possible, to take from the piece-worker all irritating non-productive labour, such as the cleaning of machinery and workrooms and the transport of materials, thus obviating another source of dispute.

If at any time it is necessary to reduce a number of piece-rates, the employer should beware of making the reduction a uniform one. Rarely is such a reduction fair: it assumes that the original rates were in strictly accurate proportion, and the science of rate-fixing is not yet so advanced as to warrant the employer taking this for granted, indeed it would be wise to spend as much time and thought in reducing established rates as in creating them.

We have already laid stress upon the importance of doing everything possible to fix the piece-rate accurately in the first instance, and not to leave the finding of the true figure to a series of experiments which have the effect of antagonising the men. The writer has found it useful in this connection to use a formula in making calculations. It is not contended for a moment that the use of a formula will keep out mistakes, but it does help in this direction, it makes for speedy calculation, and in this age of standardisation why not standardise one's calculations? In preparing the figures upon which is based the piece-rate there are many points to be considered. Let us take a very simple case: in addition to the actual time estimated for the performance of a job there is the time wasted in delays, some of which are avoidable and others unavoidable; there is the time spent in walking to and fro between the factory gates and the bench or machine; again, it has to be decided how much it is intended that the new rate will realise in earnings. Placing the factors in a tabulated form we get:—

Actual time
+ Delays (unavoidable)
+ Walking time
× Hourly rate
÷ Production
= Piece-rate,

and from these we can construct a formula which can be easily remembered; *e.g.* $\frac{(A+D+W)\times H}{P}=PR$.

In the *Engineering Magazine* (November 1913) Mr. A. Hamilton Church states that a satisfactory wage-system should (1) combine piece-work with the "stint" basis (*i.e.* definite standard of output), (2) safeguard against excessive wages arising out of progressive skill on the part of the worker, and (3) at the same time deal with errors in the fixing of rates. The present writer does not presume to put forward a system to satisfy these requirements, but he would like to recapitulate a few of the features of piece-wage systems noticed above, and to suggest that they may possibly be combined to produce a method which may prove a promising basis for experiment:—

> The proposed system should stipulate that the employee must attain a certain reasonable standard of output or be transferred to another position.
>
> It should be recognized that exceptional or increasing skill deserves a special reward, by fixing a generous limit of earnings within which no reduction will be made.
>
> If the limit thus fixed were easily exceeded, it would be fair to assume that some mistake had been made in arranging the rate; it should, therefore, be definitely announced at the time of fixing the rate that a generous margin had been allowed for a natural increase in earnings due to exceptional skill; and that, if it were found that the less skilful employees attained the limit, the piece-rate would have to be revised. Or, again, it might be agreed that after the limit had been reached a scale would come into operation which, while still leaving sufficient incentive for an expert worker to do his best, would go far to minimise the effect of errors in determining the rate.

It is intended in these pages to examine the effect of reductions in standard time, both from the point of view of the employee and from that of the employer. Let us assume that the usual time for a job, if performed on a time-wage basis, is ten hours, and that the time-rate is 10d. per hour; it is obvious that the time-worker gains nothing by reducing the time:—

TIME-WAGE SYSTEM.[1]

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Earnings . . .	100d.	80d.	50d.	30d.
Earnings per hour . .	10d.	10d.	10d.	10d.

But the effect of such saving in time on the employer's wages cost is very marked:—

TIME-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Wages cost . . .	100d.	80d.	50d.	30d.
Reduction in wages cost .	...	20%	50%	70%

and it may be stated here that under no other system does a reduction in standard time affect the employer's interest so vitally. The employer naturally would be glad to stick to the time-wage system; but it is found that a straight time-rate, with no particular incentive associated with it, does not supply that stimulus which is necessary to induce the men to do their work quickly.

The marked extent to which the employer benefits, when, under the time-wage system, the standard time is reduced, is seen more impressively, if to the cost of wages the expenses (manufacturing and administrative) are added. Assuming for the purpose of this and subsequent calculations the expenses to be 10d. per man-hour, we get the following results :—[1]

---

[1] See Appendix for complete tables and diagrams.

Time-wage System.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Wages cost . . .	100d.	80d.	50d.	30d.
Expenses, 10d. per hour .	100d.	80d.	50d.	30d.
Wages cost *plus* expenses	200d.	160d.	100d.	60d.
Employer's saving . .	...	20%	50%	70%

If we examine the figures under the piece-wage system we see at once how the employee stands to gain by reducing the standard time :—

Piece-wage System.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Piece-wage . . .	100d.	100d.	100d.	100d.
Piece-wage per hour .	10d.	12½d.	20d.	33⅓d.

---

[1] It should be noted, however, that an increased productivity frequently carries with it an increased expense charge per hour.

[2] It has been shown by Mr. Edwin H. Schell, in his article on "A Simple Piece-rate System" (*American Machinist*), that there is a point at which the operative's effort begins to "increase much more rapidly than the rate of production." To illustrate his meaning, let us take the case of a man who on straight piece-work reduces 10 hours to 8 hours and thereby increases his earnings from 10d. to 12½d. per hour. The increase in production here is at the rate of 25 per cent. and the increase in the man's earnings also is 25 per cent. Now, it may possibly be safe to assume at this stage that the man's effort increased approximately by 25 per cent. But suppose the man reduced the standard time to 5 hours. Still assuming the work to be done on straight piece-work, both the rate of production and the earnings per hour are increased by 100 per cent. But the man's effort may have increased by 125 per cent. or even 150 per cent., and here is a defect revealed in the piece-wage system. It will be one of the tasks of the future to devise a system that will adjust itself at every stage to correspond with an increase in effort, when that increase accumulates more rapidly than the increase in the rate of production.

while the employer gains nothing at all in the cost of wages:—

PIECE-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Wages cost . . .	100d.	100d.	100d.	100d.

though he still benefits (but not to the same degree as under the time-wage system) if the expenses are added:—

PIECE-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Wages cost . . .	100d.	100d.	100d.	100d.
Expenses, 10d. per hour .	100d.	80d.	50d.	30d.
Wages cost *plus* expenses .	200d.	180d.	150d.	130d.
Employer's saving . .	...	10%	25%	35%

Now let us see how the interests of the employer and the employee are affected, if, far from reducing the standard time of 10 hours, the employee is not able to do the work even within that time and is compelled to book from 11 to 15 hours on the job. Under the time-wage system the employee would, of course, lose nothing, because he is guaranteed the payment of his time-rate of 10d. per hour. The employer, however, commences to lose very heavily:—

TIME-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . .	11 hours.	12 hours.	13 hours.	14 hours.	15 hours.
Wages cost . .	110d.	120d.	130d.	140d.	150d.
Expenses, 10d. per hour . . .	110d.	120d.	130d.	140d.	150d.
Wages cost *plus* expenses . . .	220d.	240d.	260d.	280d.	300d.
Increased cost . .	10%	20%	30%	40%	50%

When time is lost under the piece-wage system the employee is in a very unfortunate position :—

PIECE-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken	11 hours.	12 hours.	13 hours.	14 hours.	15 hours.
Piece-wage	100d.	100d.	100d.	100d.	100d.
(Time-wage figures compared	110d.	120d.	130d.	140d.	150d.)
Employee's loss on the basis of 10d. per hour	9·1%	16·7%	23·1%	28·6%	33·3%

but the employer, since he continues to pay no more than 100d. for the job, is not so seriously affected, and his loss would be nil were it not for the expense charge of 10d. per hour on the increased number of hours :—

PIECE-WAGE SYSTEM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken	11 hours	12 hours	13 hours	14 hours	15 hours
Piece-wage	100d.	100d.	100d.	100d.	100d.
Expenses 10d. per hour	110d.	120d.	130d.	140d.	150d.
Wage *plus* expense	210d.	220d.	230d.	240d.	250d.
Increased cost	5%	10%	15%	20%	25%

There is a very sharp difference to the worker between, on the one hand, a time-wage system that gives him the same rate per hour whether he improves on the standard time or goes beyond it, and, on the other hand, a piece-wage system that gives him the full value of the time saved or takes away from him the full value of the time lost. Between these extremes are to be found many intermediate forms of remuneration, and the Halsey premium system, which is dealt with in the following chapter, is one of the most famous of these.

It will be worth while first to pay a little attention to the system of contract piece-work. Here the contractor himself is the piece-worker, and he usually pays a fixed time-rate, reserving for himself the excess of the contractual piece-wage over the total of the subordinates' time-wage. Sometimes the subordinates are given a time-rate which is in excess of the standard; for it is recognized that contract piece-work is associated with a greater degree of exertion than is characteristic of ordinary time-work. For the same reason the contractor may give his men a portion of the balance, if there be any. In the latter case the men may be given an equal amount each, or amounts based on time-rates, personal exertion, importance of work, age, experience, etc.

The employer finds that contract piece-work makes for increased productivity; for the contractor's balance depends upon the exertion of the men, and a direct incentive is held out to the contractor to extract from the men as much work as possible. The incentive is quickened, if the contract carries with it a time-limit with a penalty for delay.

The contractor naturally exercises a close supervision, and here again is an advantage accruing to the employer; for with such keen supervision the men find it difficult deliberately to restrict output; but, nevertheless, the history of contract piece-work furnishes evidence that the system is capable of being used without injuring the good relations between masters and men.

The advantage to the men lies in the prospect of wages in excess of the normal figure, and sometimes the men are enabled to improve their position and prospects by taking advantage of a gratuitous training on the part of the contractor.

The chief disadvantages are perhaps to be seen in the unwillingness of the contractor to look upon himself in any other aspect than that of a "driver." The contractor is not concerned with efficiency or with the expense burden; appliances, tools, and machinery do not receive from him the best attention; he is generally slow to entertain new ideas and suggestions, and usually averse to accepting reduced rates for improved tools or for an increased number of machines. It is not unknown, also, for the contractor to take more time than is necessary over a job (even though he thereby reduces his balance) in the hope of securing a more generous piece-rate.

From the point of view of the men, too, it is not good for them to look upon their immediate employer merely as a hustler; but perhaps their greatest danger is that sooner or later they may be working with an effort characteristic of piece-work for a wage that is the ordinary time-wage, or little more, thus virtually lowering the standard time-rate by associating with it an abnormal exertion.

To sum up the pros and cons: contract piece-work leads to increased productivity, necessitates less supervision on the part of the employer, and sometimes trains into skilled men those who otherwise would remain unskilled. All these advantages, however, can be obtained under the other systems, and the conservativeness of the contractor, his neglect properly to care for tools, his tendency to "soldier," and his common practice of over-exerting the men weigh down the balance against the system. The contract piece-work system should be used only in cases where supervision on the part of the employer or of his foreman is difficult, and to minimise the characteristic evils of the system, care should be taken that the groups working under these conditions be kept as small as possible.

Contract piece-work will have a better chance of success in simple repetition work than in conditions that involve planning, foresight, and other essentials of good foremanship.

CHAPTER III

HALSEY PREMIUM[1]

THE Halsey premium, commonly called the Premium Bonus, is an attempt to combine the merits of the time-wage and piece-wage systems. With this method, if a man improve on the standard time, he is given not the whole of the time saved as under the piece-wage system but a definite portion of it, commonly one-third or one-half. Again, if he lose time, *i.e.* if his time exceed the standard set for the job, he does not (as under the piece-wage method) sacrifice the hours in excess of the standard time, but he still receives time-wage for all the time worked by him; for the Halsey premium carries with it a guaranteed time wage. To take a practical illustration: supposing the time set for the job be ten hours, and the work be completed in eight hours, the operative would be given, in addition to his eight hours at time-rate, a portion (probably 33⅓ per cent. or 50 per cent.) of the two hours saved.

Obviously a very important point in the system is the fixing of the standard time, and the manner of doing this varies considerably. Commonly the average day-work record is taken as a basis, but it happens not infrequently that the quickest time in which the work has been done is adopted as the standard. Again, another variant, generous but rare, and deliberately adopted to encourage the men, is to fix the standard time actually in excess of the average time hitherto taken. In such a case, if a job formerly done in ten hours were standardised at twelve hours, with a 50 per cent. premium allowance, and actually done in eight hours, the worker would be paid for ten hours, and his earnings would be 25 per cent. higher than the time-wage figure.

---

[1] Introduced by Mr. F. A. Halsey at the Providence meeting (1891) of the American Society of Mechanical Engineers. See vol. xii. of the *Transactions.*

Mr. E. T. Elbourne, the author of *British Factory Administration and Accounts*, has written some valuable notes on rate-fixing, and the present writer, before dealing with the general aspects of the Halsey premium, would like to draw particular attention to Mr. Elbourne's thoroughly practical way of dealing with one of the standard problems in fixing a time-allowance. For example, if the time allowed for a certain job were two hours, including a half-hour for setting the machine, etc., (the "preparation allowance") the time allowance for say ten pieces would be calculated in the following way:—

Preparation allowance	½ hour.
Operating allowance, 1½ hours × 10 pieces .	15 hours.
	15½ hours.

By making a calculation of this kind the common error of ignoring the varying effect of the time spent in setting the machine, in relation to large or small quantities, is avoided. For if no such discrimination be made, it is obvious, for example, that an allowance of two hours, which includes a half-hour for setting, is less favourable to a man than an allowance of four hours, which includes a similar time for setting, if the employee be expected to produce twice as many pieces in four hours. In the one case 25 per cent. of his time is unproductive, as compared with 12½ per cent. in the other.

The Halsey premium has been in extensive operation, with a fair amount of success, and it offers many advantages. For the employer it is not so hazardous an experiment as is the piece-wage method, and for this reason, especially when the employer is manufacturing an article for the first time, or of which he has little experience, it has value as an intermediate stage between time-work and piece-work.

An important result of the operation of the Halsey premium has been to establish better relations between employers and employees. For instance, the periodical reduction of rates ("cutting") is associated much less with the Halsey premium than with the piece-wage system. The comparative absence of a fear of "cutting" allows the men to do their best, and gradually the time in which the job is done approaches that true standard time, the discovery of which ought to be the common endeavour.

It has been pointed out, however, by some employers that, while under the Halsey premium the men do their best and do not deliberately curtail output, this effort is confined to work which is paid for on the premium basis. The work which still remains on a time wage-basis is frequently (so they assert) manipulated so as to show a time record in excess of that which is accurate. The reason for this action on the men's part lies (so it is stated) in their wish to create an average time for the job which will result in a generous standard, when the time comes to transfer the job to the list of premium work.

The fundamental gain for the workman is the guaranteed time-wage. There is a feeling of security arising out of the reflection that, if he be prevented by mischance from making his normal output, there is a limit to his loss. Thus there is not for him the severe penalty that exists with the piece-wage system under which the employee suffers to the fullest extent, if he exceed the standard time which has formed the basis of the piece-rate. At the same time, under the Halsey premium he gains a fair share of the result of his increased effort. There is not the same expectation of a "cut" as under the "piece" method, and the worker is more free from the anxious and harassing dilemma as to whether he shall work at his best speed and risk a reduction in rate, or work at his normal speed and sacrifice an immediate increase in wages, under the conviction that a moderate output will, in the long run, secure him much the same remuneration.

A disadvantage of the Halsey premium, as viewed by the employer, is that under it no definite standard of attainment is laid down. It is pointed out that the men are left to choose their own speed, with the consequence that the reduction in cost proceeds slowly and without regularity. This is, of course, unsound in principle; for if it be objected, on the part of the men, that the employers too often act arbitrarily in the matter of fixing the time basis, it is equally open to the employers to demur to its being left to the workmen to say exactly how much work they will do. It must be borne in mind, however, that when the Halsey premium is used in connection with work of an indeterminate nature, such as repair jobs, it is unreasonable on either side to expect the same definite basis to be used, as when the work is of a routine nature and when its conditions and progress can be foreseen from beginning to end.

Many experts object to the indefiniteness of the time-standard under this system. The indefiniteness is reflected in an output which, though it may be creditable, must inevitably be far short of the maximum obtainable. It is stated, also, that the standard time adopted is too often dependent on the varying ability of the worker. There is frequently no attempt to observe the performance in the hands of a trained worker, thus the possibilities in this direction are largely ignored. Complaints of this nature, however, apply more or less to all existing wage-systems, as they are practised in England. To satisfy them, not only must first-class men be attracted by high wages and submit themselves to a severe training, but the conditions under which the work is done, *e.g.* the supply of raw material, the provision of specially adapted tools, gearing, and machines, must first be highly organized, and for these we must look to what is now being called "Scientific Management."

The fundamental disadvantage of the Halsey premium, as compared with the piece-wage system, in the eyes of the employee, is to be found in the fact that only part of the saving in time is secured by him. And when the premium is no more than 33⅓ per cent., the incentive for a workman to do his best is considerably diminished. There remains in his mind a feeling of injustice: he feels that he has rightly earned if not the whole at least the major portion of the time saved. Any accurate comparison, however, of premium and piece-wage must rest upon an identical time-standard. For example, if the standard time be 10 hours, and if, under piece-wage, the rate be fixed at the value of 7½ hours at 10d. per hour, the rate for the job would amount to 6s. 3d. Now if the time-basis, under a 50 per cent. premium, were fixed at 10 hours, *i.e.* at the standard time, and the employee, using the same effort as when on piece-work, finished his work in 7½ hours, his earnings would be:—

7½ hours at 10d. + 50 per cent. of 2½ hours at 10d. = 7s. 3½d.

So that if the time-basis of the premium system be a generous one, the worker may easily stand to gain even more than under piece-work. On the other hand, if the time-basis of the premium be very low, the worker may lose in two ways—he may gain no more than 33⅓ per cent. or 50 per cent. of the time saved, and, in addition, find it difficult to reduce the standard time to any extent at all. To illustrate this, let us take a standard time of 10 hours and reduce it to 8 hours as the basis of the premium. If the time taken on the job amounted to 7 hours, the worker under a 50 per cent. premium would get:—

7 hours at 10d. + 50 per cent. of 1 hour at 10d. = 6s. 3d.

Now, if the job had not been placed under the premium system, the employee, as a time-worker, would have got only 5d. less in the 7 hours, working without special effort.

The reader will have gathered ere this that the piece-wage system is virtually a 100 per cent. premium system. But there is a profound difference—with the former, if time be lost, the worker altogether sacrifices that time; with the latter, the time-wage is guaranteed. It frequently happens, however, particularly in the engineering trade, that piece-workers are guaranteed the time-wage.

The writer knows a factory in which is used an interesting variant of the premium system. In the case of a man whose theoretical rating is 10d. per hour, he is paid a time-rate of 5d. per hour and in addition a piece-rate which is calculated to yield at least a further 5d. per hour. This is equal to a 50 per cent. premium system, as will be seen by the following examples: Under the 50 per cent. premium system, a man working upon a job whose standard is 10 hours and doing it in 8 hours, is paid:—9 hours at 10d. = 7s. 6d. Under the system spoken of he would get a similar amount, *e.g.*:—

8 hours' time-wage at 5d. . .	3s. 4d.
Piece-wage, to yield a wage equal to 10 hours at 5d.	4s. 2d.
	7s. 6d.

The system just described, an ingenious attempt to combine the merits of the piece-wage and premium methods, has been used with considerable success in the solitary instance known to the present writer. It is one of the advantages of this system that, when it is desirable to use caution in starting a piece-wage scheme, the nominal rate of 10d. per hour can be divided so as to yield a low piece-wage basis and a high day-rate, *e.g.* the rate of 10d. per hour could be divided to give 8d. per hour as a fixed-time rate with the obligation of fixing a piece-rate capable of yielding at least 2d. per hour. It will readily be seen that the consequences of grave error in fixing piece-rates are minimised by such an arrangement.

In the ordinary premium system the premium is based on the difference between the time actually taken and the standard time. The late Mr. D. F. Schloss, in one of his earlier writings, gives an example of an interesting system which departs slightly from the normal method. No standard time is fixed; instead a "reference rate" is fixed for each operation. The "reference rate" is rather more generous than the average cost of time-wage. The premium is one-half of the difference between the wages cost and the "reference rate." It will be seen that this system is identical in principle with a Halsey premium that gives a generous standard time-allowance. It is interesting to notice that under the "reference rate" system the premium was not calculated separately for each process or operation which carried a reference rate. The method adopted was to take, for a given period, the sum of the "reference rate" items and the sum of the time-wage payments made to the individual or group, and, as described above, pay as premium half the difference between the two. Such a method considerably reduces the clerical work necessary to calculate the premiums, and here is another important recommendation for it: if the premiums had been calculated separately for each item, there would have been held out to the employee a quite unnecessary temptation to manipulate his time records. Let us take the case of an employee who discovers that, owing to the length of time taken, there is little prospect of his gaining a premium. He may then be tempted to book more than the actual time worked on the unremunerative job and less than the proper time on the next piece of work. The result would be to inflate the premium on the second task, while the employee would receive the guaranteed time-rate for the whole of the time occupied on the preceding job.

For the same reasons it is advisable, when using the Halsey premium, not to calculate the premium separately for each job but, taking the sum of the standard times and the sum of the actual times for a convenient period, to make one calculation of the premium.

It is occasionally recommended by advocates of the Halsey premium that, on the whole, better results are gained by making the premium rate low and the time allowance generous, than by paying a high premium rate and making the time-standard severe. In the latter case, as pointed out by the late Mr. D. F. Schloss, the exceptionally able workman will earn a high bonus, whilst the average employee will earn no bonus at all and will be discouraged. The employer will be tempted to reduce the time allowance, with the usual disastrous consequences of "cutting." But in cases where expensive machinery is used, necessitating a high degree of skill on the part of the worker, it may be considered whether better results could not be obtained by a rigorous time-standard and a high premium rate. It is suggested also that concessions under the Halsey premium should be in the form of an increased time-allowance rather than in an increased premium rate. The reason for this preference lies in the greater security to the employer under a low premium rate, since the effect of an error in the fixing of the standard time—and such errors are exceedingly difficult to avoid altogether—is minimised. For the same reason, too, it is specially advisable to fix a low premium rate when dealing with work of which the employer has little or no experience, and where his estimate of the probable duration of the work is likely to be more or less inexact.

By maintaining as far as possible a uniform premium rate and making all alteration affect the standard time, the confusion and the liability to error caused by a variety of premium rates are avoided.

Those who make trial of the Halsey premium are also strongly advised to refrain, if possible, from lowering the standard time. Before the men will use the system to the best advantage, it is necessary that they should gain confidence in the employer's sincerity, and that they should not be allowed to live in fear of that systematic "cutting" which on the part of many employers has contributed so much to bring the piece-wage system into disrepute.

It will encourage the men, also, if the premiums be paid at short intervals—weekly if practicable. Otherwise, as there is no frequent incentive, the standard of efficiency reached falls far below what is possible.

Continuing the examination of the effect of reductions in standard time, commenced in Chapter II., we obtain the following figures relating to the operative. For convenience in calculation the premium rate is taken as 30 per cent. instead of the more common 33⅓ per cent. :—

HALSEY 30 PER CENT. PREMIUM.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Time-wage . . .	100d.	80d.	50d.	30d.
30 per cent. premium .	...	6d.	15d.	21d.
Wage *plus* premium .	100d.	86d.	65d.	51d.
Earnings per hour increased by . . .	...	7·5%	30·0%	70·0%

If the premium rate be 50 per cent., the increase in the hourly earnings is :—

10 hours.	8 hours.	5 hours.	3 hours.
...	12½%	50%	116·7%

The employer's figures are now shown :—

Standard time = 10 hours.
Time-rate = 10d. per hour.
Premium rate = 30 per cent.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Wage *plus* premium .	100d.	86d.	65d.	51d.
Expenses 10d. per hour .	100d.	80d.	50d.	30d.
Wage, premium, and expense	200d.	166d.	115d.	81d.
Reduction in cost . .	...	17%	42·5%	59·5%

If the premium rate were 50 per cent., the percentages of reduction in cost would be :—

10 hours.	8 hours.	5 hours.	3 hours.
...	15%	37½%	52½%

If the employee fails to attain standard time, he loses nothing beyond his premium, since he is guaranteed a time-wage. The employer, however, loses by reason of the greater expense the job bears because of the increased hours. The extent of the loss is identical with that when time is lost under the time-wage system, as was shown in the comparisons in Chapter II.

CHAPTER IV

THE ROWAN PREMIUM[1]

The Rowan system follows the Halsey premium in paying a portion of the time saved, but, instead of giving to the worker a fixed percentage of the saving, it adds to his actual time a percentage identical with that by which the standard time is reduced.[2] Thus, if the employee performs a task in eight hours, the standard having been fixed at ten hours, he would get as premium two-tenths or 20 per cent. of eight hours = 1·6 hours. The young reader should be careful to note that the premium percentage is applied to the time actually worked, and not to the time saved. So, in the case quoted, the premium rate, 20 per cent., is added to the hours worked, *i.e.* to eight hours. It would be wrong to take 20 per cent. of the time saved, *i.e.* of the two hours, and call that the premium. If it be remembered that—

when one-quarter of the time is saved, time and a quarter is paid,
when one half ,, ,, time and a half is paid,
when three-quarters ,, ,, time and three-quarters is paid—

there will be avoided the liability to confuse the method of calculation with that of the Halsey premium.

If the standard time be exceeded, the worker gets time-wage for the whole of his time; in other words, the time-wage is guaranteed.

---

[1] Mr. David Rowan, *Proceedings of Inst. M.E.*, September 1901.

[2] "Premium exceeds time-wage by the same proportion as that which the saving in time effected bears to the standard time."—D. F. Schloss.

The advantage of this method of paying a premium is held to consist in the marked incentive it gives to the employee in the early stages of saving of time. With a standard time of ten hours, successive reductions of one, two, three, and four hours leave him with a premium higher than that obtained for similar reductions under the 50 per cent. Halsey premium. The worker's gain would, of course, compare more favourably still with that under the 30 per cent. Halsey premium. At five hours, *i.e.* at a reduction of 50 per cent. in the standard time, the 50 per cent. Halsey and the Rowan offer an identical premium to the employee who, at this point, increases his hourly earnings by 50 per cent.

The employer is strongly safeguarded against the consequences of a gross error in the fixing of the standard time. For after a 50 per cent. reduction in the time-standard the employee's benefit rapidly deteriorates in comparison with the Halsey premium. If the standard time be reduced to four hours, the employee receives a 75 per cent. increase of hourly earnings under the 50 per cent. Halsey premium, as compared with 60 per cent. increase under the Rowan. If there is a further reduction of time, say to three hours, the 50 per cent. Halsey premium yields an increase of 117 per cent., but the Rowan only a 70 per cent. increase, which is the same, at this point, as under the 30 per cent. Halsey premium.

On the other hand, if the mistakes made in fixing the standard time are not serious, the employer is penalised to a greater extent than under the Halsey premium; for, as already shown, the workman gets a higher rate per hour, up to 50 per cent of time-saving, under the Rowan method.

The operative may be somewhat discouraged by the thought that under the Rowan system the incentive is largely reduced after a 50 per cent. reduction in time. This defect, however, is more theoretical than practical; for if the determination of the standard time is obtained in anything like an efficient manner, it is rarely that a reduction of more than 50 per cent. can be effected. It has been pointed out by the advocates of the Rowan system, in considering this point, that, if the reduction exceed one-half, it will probably be due to some such factor as an improvement in tools or machinery; or it may be the result of a betterment of facilities or organisation. Any such improvement, however, should be followed by a reduced time-standard. It is not fair to the employer that the employee should reap the whole of the advantage of an improvement in the efficiency of the management. On the other hand, few employers will reduce the time-standard in strict ratio as the result of such a change as indicated above, and it is customary to give the employees a share of the benefit.

The Rowan system is not so easily understood as the other systems, and calculations of its premium are not made so readily by the employees. Care then should be taken, when introducing it, that the workman fully grasps the principles of the system. As the best way of avoiding misunderstanding and subsequent friction, the employee should be given a printed card showing how much more per hour his wages amount to for say each additional fifteen minutes by which the standard time is reduced.

It has been pointed out by the late Mr. Schloss that under the Rowan system the gain to the employee is a variable proportion. Mr. Hamilton Church says the same thing, when he tells us that the system operates as would a falling premium rate. The student will find it a useful exercise to test this statement. Let us take examples at two different points in the saving of time, viz. at nine hours and at eight hours, the standard time being reckoned as ten hours. At nine hours the operative receives as premium 10 per cent. of nine hours = nine-tenths of an hour or 90 per cent. of the one hour saved. At eight hours he is paid 20 per cent. of eight hours = 1·6 hours, or 80 per cent. of the two hours saved. If we make further calculations, we find that the Rowan system may be expressed in the terms of a Halsey premium in the following way:—

Standard time = 10 hours.

If task takes	9 hours,	90 per cent. Halsey premium.
,, ,,	8 ,,	80 ,, ,,
,, ,,	7 ,,	70 ,, ,,
,, ,,	6 ,,	60 ,, ,,
,, ,,	5 ,,	50 ,, ,,
,, ,,	4 ,,	40 ,, ,,
,, ,,	3 ,,	30 ,, ,,
,, ,,	2 ,,	20 ,, ,,
,, ,,	1 ,,	10 ,, ,,

Some experts regard this characteristic of the Rowan system as an excellent device for safeguarding the interests of the employer, as it makes it impossible, as we have seen, for the workman to earn "double time," however great an error may have been made in fixing the standard time. They go on to ask whether the combination of the Rowan principle with the imposition of a task, or definite standard of efficiency, is possible. Such a task or standard is implied that would be much more rigorous than the normal standard customary under the Rowan method. For the attainment of this standard a good bonus would be paid. It is presumably sought to create such a system as will stimulate the exceptionally able employee to do better than is implied in the fulfilment of the difficult task. At the same time, the task once accomplished, the employee's earnings are not to be allowed to increase rapidly, but only at a rate sufficient to maintain the incentive. It seems to the writer that a modification of the Gantt bonus method (see Chapter VII.) might form the basis of an interesting experiment in this direction. Supposing the bonus to remain as a rigid 40 per cent. of the standard, even though time be saved and the employee be paid his actual time-wage plus 40 per cent. of the standard, we should then get the following figures, which are based on a standard of ten hours and a day-wage of 10d. per hour. For the attainment of the task the employee would receive 1s. 2d. per hour, and at the successive hourly points in the saving of time he would be paid per hour 1s. 2·4d., 1s. 3d., 1s. 3·7d., and 1s. 4·7d., until, when he performed the task in half the time, a most difficult achievement, he would get 1s. 6d. per hour or no more than 28·6 per cent. increase beyond the earnings he would have obtained, had he done the work in the task-time of ten hours, a performance probably already difficult of attainment.[1]

Now to what extent does the employee benefit, if he reduces the standard time under the Rowan premium?

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . . .	10 hours.	8 hours.	5 hours.	3 hours.
Time-wage . . .	100d.	80d.	50d.	30d.
Premium	...	16d.	25d.	21d.
Wage *plus* premium . .	100d.	96d.	75d.	51d.
Wage per hour increased by	...	20%	50%	70%

We see, too, that the employer benefits considerably when the standard time is reduced. Reckoning the expenses at 10d. per hour, we obtain the following results:—

Time taken	10 hours.	8 hours.	5 hours.	3 hours.
Wage *plus* premium . .	100d.	96d.	75d.	51d.
Expense, 10d. per hour .	100d.	80d.	50d.	30d.
Wage, premium, and expense	200d.	176d.	125d.	81d.
Reduction in cost . .	...	12%	37·5%	59·5%

It will be noticed that when half the time is saved the reduction in cost is identical with that for a similar saving in time under the Halsey 50 per cent. premium.

The employee's premium increases up to the point when

---

[1]

	10 hrs.	9 hrs.	8 hrs.	7 hrs.	6 hrs.	5 hrs.
Bonus .	40d.	40d.	40d.	40d.	40d.	40d.
Wage .	100d.	90d.	80d.	70d.	60d.	50d.

the standard time is reduced to five hours. Afterwards it is reduced so that the premium at four hours is equal to that at six hours, at three hours it is equal to that at seven hours, while the premiums at two and one hours are successively equal to those at eight and nine hours:—

Time taken.	Premium.
9 hours.	1/10 of 9 hours = 0·9 hours.
8 "	2/10 " 8 " = 1·6 "
7 "	3/10 " 7 " = 2·1 "
6 "	4/10 " 6 " = 2·4 "
5 "	5/10 " 5 " = 2·5 "
4 "	6/10 " 4 " = 2·4 "
3 "	7/10 " 3 " = 2·1 "
2 "	8/10 " 2 " = 1·6 "
1 "	9/10 " 1 " = 0·9 "

It will be useful at this stage to compare the results from the point of view both of the employer and the employee, of the various systems already described, eliminating for the purpose of this comparison the time-wage system. The standard time, it will be remembered, is ten hours and the time-rate 10d. per hour.

Taking the employee's case first, we find that a straight piece-wage system is far and away the most remunerative, yielding as it does at successive reductions of one hour earnings increased to 11·1d., 12·5d., 14·3d., 16·7d., 20·0d., 25·0d., 33·3d., 50·0d., and (in the highly improbable event of reducing the time to one hour) 100·0d. per hour.[1]

The next best system from the point of view of remuneration is the 50 per cent. Halsey premium, though it is inferior in this respect to the Rowan until the standard time has been reduced by more than 50 per cent. The figures to be compared with those given above range from 10·6d. to 55·0d. per hour. Compare the 30 per cent. Halsey premium which ranges from 10·3d. per hour to 37·0d. The Rowan premium, next to the piece-wage, is the most remunerative up to 50 per cent. reduction in the original time-standard. At this point, *i.e.* at five hours, the employee's earnings are 15d. per hour or identical with that under the 50 per cent. Halsey. For subsequent reductions in time the Rowan is the least remunerative, with the exception of the 30 per cent. Halsey, to which it is superior until the three-hour mark where they coincide in giving 17d. per hour. At two hours and one hour the Rowan pays the least of all, giving 18d. and 19d. per hour respectively. The figures under the 30 per cent. Halsey premium are 22d. and 37d. per hour.

---

[1] See Appendix for complete tables and diagrams.

If the employee not only fails to reduce the standard time but actually exceeds it, he will still be paid his full time-rate under the Halsey and Rowan premium systems and, of course, also under the time-wage system. But if he exceeds this standard, under the piece-wage system he immediately commences to lose heavily, as we see below :—

Piece-wage System.

Standard time = 10 hours.
Time-rate = 10d. per hour.

Time taken . .	10 hrs.	11 hrs.	12 hrs.	13 hrs.	14 hrs.	15 hrs.
Earnings per hour	10·0d.	9·1d.	8·3d.	7·7d.	7·1d.	6·7d.

In the case of the special system described in the preceding chapter,[1] since the employee retains 50 per cent. of his standard wage as a day-wage interest, he is to that extent safeguarded from the consequences of failure to perform the task within the time which forms the basis for the determination of the piece-rate. The following figures relate to this special system, and should be compared with those given above :—

Time taken . .	10 hrs.	11 hrs.	12 hrs.	13 hrs.	14 hrs.	15 hrs.
Earnings per hour	10·0d.	9·5d.	9·2d.	8·8d.	8·6d.	8·3d.

These figures will illustrate the steadying effect of this method when the standard time is exceeded.

---

[1] Page 33.

How is the employer affected by loss of time, when the standard time is exceeded? Under the time-wage, the Halsey and the Rowan premium systems, he is affected to precisely the same extent. At eleven hours his cost would have increased by 10 per cent., and further increases in the time would be accompanied by a cost of a further 10 per cent. for each additional hour.

But, with the piece-wage system, the employer does not lose at so rapid a rate, since his extra cost relates only to his hourly expenses; while the employee suffers the whole of the loss in wages, if the standard time is exceeded. It will be found then that with the expense burden at 10d. per hour the employer's figures for excessive time show:—

Time taken . . .	11 hrs.	12 hrs.	13 hrs.	14 hrs.	15 hrs
Cost figures increased by .	5%	10%	15%	20%	25%

CHAPTER V

COST PREMUIM

In Chapter III. we noticed a variation of the Halsey premium termed the "Reference Rate." The Cost premium, which is not a well-known method, follows the "reference rate" in fixing a definite wage figure as a standard, but it introduces a new feature. Not only does it give the workers a direct interest in the time saved, it also induces them to make an effort to be economical in the use of raw material, and to reduce the cost of those items of factory expense which are affected by care, or the lack of care, on the part of the employees. For instance, it may readily be imagined that, in addition to economy in the use of raw material, it is possible for the men to reduce substantially the expense of stores, if it be made to their interest to do so. The cost of other items, too, such as heating, lighting, and repairs, may be affected by a closer regard for economy.

Following this theory, we find that there are three factors entering into the Cost premium, viz. raw material, wages, and workshop expenses. It may be noted, in passing, that the raw material is reckoned at a fixed price; this item therefore is independent of market fluctuations. Otherwise it would be necessary frequently to alter the "standard cost" figure, and thus introduce a disturbing element into the system which would seriously prejudice its chances of success.

The following are the figures which show a typical prime cost in its simplest form:—

Raw material	20s. 0d. per ton.
Average day-wage	60s. 0d. „
„ expenses, selected items .	15s. 0d. „
	95s. 0d.

and these figures are adopted as the standard cost. In some cases, however, the employer generously allows a standard cost which is higher than the average figure. In other cases the employer is exacting and fixes a standard more difficult than average effort had hitherto been able to attain. Assuming 95s. per ton to be the adopted standard, and that the employees, by increased efficiency, reduce the cost to 90s. per ton, the balance of 5s. per ton will form the fund from which the men are rewarded for their special effort. Assuming, again, that it is agreed that employers and employees are to share alike in the bonus, the workers will be paid 2s. 6d. per ton bonus in addition to their ordinary time-rate.

The system is usually superimposed on a time-wage system, and is not generally meant to interfere in any way with the customary time-rates.

The employees will not necessarily share alike in the distribution of the bonus earned. If their time-rates are different, these may indicate the ratio in which they participate, *e.g*, a man whose rate is 36s. may get a share higher by 20 per cent. than a man rated at 30s. Or the employees' shares, for the purpose of this division, may be calculated according to their efficiency. The efficiency values of men do not necessarily correspond with their time-rates, and it will frequently be found that men of equal efficiency are rated differently on account of extraneous considerations, such as length of service and age. But, to obtain the best results from the system, the distribution of bonus should be on a strictly scientific basis. When this is done, it will be found that men whose time-rates are, *e.g.*, in the ratio of 3, 2½, and 2 may share the bonus altogether out of proportion to their time-rates. The leading hand may be given a special share;

but care should be taken that the share falling to a leader is not so high as to be out of proportion to his effort in creating the bonus fund, otherwise dissatisfaction will be caused among the subordinate members of the group.

In the example given above it was supposed that the employer and employees would divide the bonus equally. In some cases, however, it would pay the employer to give the operatives even the whole of the bonus. The standard cost would remain at the same figure, it is true, but the standard cost in this case is not the whole of the cost. Only a few of the expenses have been included in our standard cost. If the work is done in less time than formerly, although at the same standard cost, the expenses not hitherto considered, *i.e.* those not included in the selected items, such as rent, rates, taxes, depreciation, management, and interest, would obviously be lower for a job taking a shorter time. It is in this way, through a reduction in the complete cost, that the employer gains.

In this case it is supposed that the employer calculates his expenses on a time basis, *i.e.* at so much per hour. But even if he calculates in the widely prevailing way of applying them as an average percentage of wages, or of wages and materials, the result would still be reflected in a lowered cost; for the accelerated speed at which the work is done under the Cost premium results in an increased proportion of "materials and wages" figures in relation to the other cost figures. If, then, the same total of management and administrative expenses is added to an increased basis figure, the percentage of expenses is decreased, and, in consequence, the cost per unit reduced.

The giving of one-half or the whole of the reduction in standard cost to the employees does not exhaust the various ways in which the distribution of what we may call the bonus-fund is effected. It may be useful to employ a graduated scale, which would be specially designed to encourage the workers in their attempt to reduce the standard cost. Such a scale, for example, may give the workers a much higher percentage of the bonus fund in the early stages of cost reduction, and automatically yield the employees a lower percentage as the reduction in standard cost proceeds. Yet the scale must be so arranged that the workers are supplied with a continuous incentive to go on improving on their record. The employer, too, would receive benefit from the use of a scale of this sort; for it would serve to protect him against the full consequences of a big error in the calculation of standard cost.

Although the Cost premium is designed for use with a time-wage system, it may be used also with the piece-wage method. It can easily be imagined that, though a piece-wage method may be satisfactory in stimulating production, the cost of stores and the percentage of waste may remain deplorably high. When conditions of this sort exist, it may be found desirable to superimpose a Cost-premium on a piece-wage system. Thus would be created the dual incentive; the incentive to increase production and, at the same time, to reduce the factory expenses. There should be here a specially strong stimulus to the worker, since, when he reduces the customary time, not only does he gain as a piece-worker, but he gains by an increased Cost premium resulting from that same decrease in the time record.

It may also be found useful to experiment with this system in connection with contract work, and especially with workshop contracts. It may be true that the contract system is successful in bringing about increased production. But how frequently in the case of contracts has not this result been achieved with a fine disregard of the questions of avoidable waste, care of tools, and general economy in working? Hence it is obvious that it must be made to the interest of the contractor to have regard for an all-round efficiency. One method of securing his attention to these points is, as in the case of the employees, to give him, in addition to his contract bonus, a premium which is the reflection of his efforts to use machinery, tools, and materials to the best advantage. The contractor, if he be wise, will see that his men get their share of the premium awarded to him.

The foregoing is an attempt to explain the system as it works in factories. In the case of mercantile establishments the basis of calculation is necessarily somewhat different. The factory expenses are here replaced by the operating or distributive expenses, or by that portion of them which can be affected by the care and zeal of the staff. Interest in economy and increase of trade can be as fruitfully stimulated among warehousemen and clerks as among factory operatives, and there have been some striking successes arising from the zealous application of this system in distributive concerns.

The system, too, can be usefully employed in business houses whose operations are purely financial, and whose basis of the Cost premium is the administrative expenses. As this little book, however, is concerned with factory wage-systems, it is rather beyond its scope to deal further with the application of the Cost premium in this direction.

We have seen that the Cost premium applies a dual stimulus: it supplies an incentive to increased production and also to economical working. Herein lies its peculiar merit; for few of the other systems do more than urge a man in one direction, that of increased output. The created interest of the men in economy will react favourably on the question of supervision, while the added concentration with which the employees work will improve the quality of the product. The sense of a common interest, also, will do much to harmonise relations between employers and employees, and thus enable the managers to spend more time in the work of improving the administration.

In cases where Cost premiums are not calculated separately for each job, it is sometimes claimed that another argument in favour of the Cost-premium system, where it is employed with the piece-wage system, is to be found in the fact that through its use there is for the worker no inequality in the piece-rates. That is to say, although some rates may be high and others low, the employee is not affected, because high and low rates are pooled in the merging into one calculation of the figures relating to a number of jobs. The high rate is held to "pay for" the low rate, and the result is not unsatisfactory to the employees, who will judge the Cost premium purely by its yield to them in the form of increased earnings. It is true that the operatives may be satisfied so long as the net result is a higher wage, but a reflection of this sort is not so satisfactory to the employer. Indeed, consciously to maintain in operation rates which are either too high or too low, is to remain in a condition which is thoroughly unsound. Suppose that trade fails in those articles or in that product for which the rates are known to be too high; imagine, too, that these rates, though known to be too high, have not been adjusted, because the products to which they relate are especially profitable lines; then assume that trade in those lines suddenly falls off; the employers will then be faced with a sudden demand on the part of their workers for increased rates on the lines which are least profitable. One can easily see that in this way a very awkward situation may be created for the employer. Again, take the case of a factory where a box of varied goods is sold as a unit. Some of the articles in the box may be generously rated and pay the operatives well; others are not so remunerative, the rates for the latter being accepted by the workers only because they are associated with the better rates. The sales manager comes with a new idea for a group of articles and selects units here and there from the old box with no thought of their comparative remuneration to the employees. Is not it a serious hindrance to the sales manager to be told that he may not select from the point of view of a salesman, but that he is to be tied down to certain arbitrary groupings because of the inequality in rates? Enough has been said, perhaps, to convince the reader that it is desirable that each piece-rate should stand by itself, though it is difficult, sometimes, to observe this principle, especially in the case of lines in which there is keen selling competition.

The infrequency with which the premium is paid to the employee is often a serious drawback. There is a strong preference on the part of the men for weekly settlements. The delay in paying the premium, when the payment is not made until the end of the month or quarter, is highly prejudicial to the exercise of a strong and steady stimulus. At the most, settlement should not be delayed for more than a month. In the light, too, of the progress of factory accountancy, it is becoming more and more possible to look to a time when those expense accounts which relate directly to raw material, wages, stores, and workshop expenses (and consequently to the Cost premium) will be compiled weekly.

Another defect alleged to be inherent in the Cost premium is the unfair way in which the employees are affected by a period of bad trade. The men may do their part in lowering the cost and in faithfully working the system. The curtailment of output, however, automatically increases the cost, since the standing charges will not decrease in proportion; in some instances they will remain at the old figure. Thus the employees may be penalised by losing their premium owing to causes entirely beyond their control. This argument applies more particularly to those Cost-premium systems in which many expense items are included which are not under the control of the employees. Items of this nature are the charges for rent, rates and taxes, depreciation, etc. The better forms of Cost premiums rigidly exclude such items and confine the items of expense to those which, whether trade be good or bad, are constantly influenced by the care, or lack of care, of the employees. If it be desired to give the workmen an interest in all the items of the profit-and-loss account, one may as well adopt a departmental profit-sharing system.

It is desirable, in operating the Cost premium, to make the groups of employees, who form the units under the system, as small as possible. The reasons which make small groups advisable have already been stated in dealing with piece-wage systems, but they apply with strengthened force here. The sphere within which keener mutual supervision is exercised is enlarged by an addition, *i.e.* workshop expenses, which is peculiarly susceptible to the influence of the increased zeal and concentration characteristic of the small group.

It is wise, also, to take care that the practice of "cutting" does not become associated with the Cost premium. There is an opportunity here for employers to make a break from tradition, and to show the employees that the newer systems are not devices for reducing wages; rather are they systems of common profit, seeking to find some basis of calculation which will remain unchanged for long periods. Reduction in standards should not take place at all, unless improved machinery and facilities result in a definite gain to the worker without a corresponding increase of effort or responsibility on his part.

Another recommendation is that the "standard-cost" figures for a new job, which is to be paid on the Cost-premium basis, shall be published in advance. Many misunderstandings and possibilities of friction will thereby be avoided. For example, it is extremely annoying to the employees to learn, long after work on the job has commenced, that the standard-cost figure is far below that anticipated.

Again, it is desirable that the figures published by the employers, and stated by them to represent the results obtained by the employees in their efforts to reduce the standards, shall be audited by a chartered accountant nominated by the employees. Such an audit is not infrequent in profit-sharing schemes and does much to give the men confidence in the equitable operation of the system. It may be necessary to take special precautions against the disclosure of information which may be of use to the employer's competitors. One may trust the average accountant to deal with difficulties of this nature; he is accustomed to deal with them in profit-sharing schemes. But it is far easier to audit a profit-and-loss account than numerous Cost-premium accounts! Yet, in the additional smoothness with which the system will operate, the employer will receive adequate recompense.

In cases where the premium is calculated separately for each job, one of the problems arising from the use of the Cost-premium is how to deal with losses, *i.e.* with those cases where the actual cost figures exceed the standard. Shall the losses be carried forward, to be applied as a debit against future premiums? On the one hand it is disheartening for the Cost-premium worker to be carrying a load of debt on his shoulders. The real incentive is weakened, if there is the knowledge that the bonus which is being earned is to be applied to the reduction of an adverse balance, and that some time will elapse before a premium again materialises. For this reason it will probably pay the employer far better in the end to release his men from the liability of the adverse balance. In any case, if it frequently happen that the cost figures are in excess of the standard, there is a strong suggestion that the employer is somewhere to blame. Under normal circumstances the workers' response to a stimulus to earn an increased wage is instant and sustained; and, if the increase is not effected, the task set is probably too severe or the conditions unfavourable.

But if the point is conceded and the adverse balance cancelled, another difficulty arises, when the Cost-premium method is used with a time-wage basis. Supposing a group of men to be at work on a job which, in the course of its performance, promises difficulty in the reduction of the standard cost. Then, as under the time-premium (the Halsey premium), there is the temptation to manipulate the time records in such a way as to swell the bonus on the next job, if the latter be of a profitable nature. The time booked against the unprofitable task is exaggerated without loss to the employees as they are paid time-wage. The time recorded against the succeeding profitable job is less than that actually worked—thus swelling the bonus. If the time in each case had been booked accurately, the men would have received for the two tasks, taken together, the same time-wage but a lower premium.

The danger must be faced and can largely be avoided by a closer check of the time records. It may be desirable to appoint an official whose special duty would be to relieve the foreman of responsibility for the details of the time booked. In appointing a man suitable for this class of work, it is best to look for one who unites the ability of a well-trained clerk with an intimate knowledge of the details of manufacture. The average foreman too often regards the scrutiny of the men's time-sheets as of less importance than his other duties. Frequently, indeed, he does not possess the clerical ability properly to check a time-sheet by those methods the knowledge of which is a part of the equipment of a capable wages-clerk. That is to say, his scrutiny is too often mechanical, and does not attempt that closer checking which makes comparisons, detects inconsistencies, and looks for evidence of wasted time, or time lost through defective organization, or time booked in excess of accepted estimates.

How best can one deal with unprofitable workers in a Cost-premium group? By the fixing of standard times for each man's work, where this is possible, and by testing the worker's performance against this standard.

If a man constantly fails to attain the standard (supposing it to be accurately and not too severely fixed), he should forfeit his claim to participate in the premium earned by the group. This method, of course, has the defect of assuming that, if the employee does not economise in time, neither does he in raw material and factory expenses. But, if the foreman's observation confirms the clerical test, it is a fairly reliable assumption to make. It would be better still if a man's record could be separated in respect of all that his labour affected—materials, labour, and expenses. If this were possible, however, it would be advisable to substitute an individual Cost premium for the collective form.

An American variant of the Cost premium is noted by Mr. Frank E. Webner in *Factory Costs* (The Ronald Press Co., N.Y.) under the title of the "List Percentage Plan." Under this system the foreman acts as a contractor and undertakes to supply labour at a certain cost per unit of product. This labour cost is the equivalent of a predetermined percentage of the selling price and is arrived at after a careful analysis of cost-figures. In the illustrative case quoted by Mr. Webner, a foreman is in charge of a department whose normal labour cost per unit is 2·6 per cent. of the selling price. The foreman is credited with his output at this figure per unit. If he can save anything by economical use of labour, the gain is his. Usually, however, and as is sometimes the case with contractors, the foreman shares his profits with the men. It appears to be a disadvantage of this system that the figure represented by the list-percentage requires frequent adjustment. One can see that this is almost inevitable, since the labour allowance per unit, being a percentage of the selling price, is not a rigid figure but must necessarily be affected by the buying and selling markets. A further defect in this system, in common with so many other premium systems, is its concentration on only one aspect of workshop efficiency, *i.e.* economy of labour.

CHAPTER VI

THE DIFFERENTIAL PIECE-RATE

The differential or graduated piece-rate is a method of remuneration which has come into much prominence in America because of its employment by the late Dr. Taylor, who introduced it in the earlier stages of his famous experiments, with the aim of encouraging a maximum production. Its history is not confined to America, but is to be traced also in Lancashire where, many years ago, it was associated with the cotton industry.

The principle of this system lies in its careful adjustment of reward to performance. For a high output a high piece-rate is given: but, as employed by Dr. Taylor, the high rate was sacrificed if any part of the product failed to attain a predetermined standard in respect of quality or accuracy. "With one piece imperfect and thrown out, his whole scale is lowered."

Below the high output the piece-rate decreases, until for a low output a low piece-rate is paid. The more a man produces, the greater does his piece-wage become; but, apart from this, he also gets a higher rate for the whole of his work, thus securing a twofold gain.

On the other hand, if a man has a poor output to his credit, not only does he lose in the quantity of his piece-work, but, in addition, his smaller output is calculated at a decreased piece-rate. Some firms, however, fix a minimum wage and do not allow their workers to get less, however unfortunate they may have been in their week's work.

This is a system of which it may truly be said that nothing succeeds like success and nothing fails like failure.

The differential rate is usually associated with output, and a simple example of its employment may be given. A man may be given a scale of rates as follows:—

Output	6	dozen units	per hour.	Piece-rate	1s. 0d.	per gross.
,,	7	,,	,,	,,	1s. 1d.	,,
,,	8	,,	,,	,,	1s. 2d.	,,
,,	9	,,	,,	,,	1s. 3d.	,,
,,	10	,,	,,	,,	1s. 4d.	,,
,,	11	,,	,,	,,	1s. 5d.	,,
,,	12	,,	,,	,,	1s. 6d.	,,

The net wages under this scale are successively 6d., 7·6d., 9·3d., 11·2d., 1s. 1·3d., 1s. 3·6d., and 1s. 6d. per hour.

These figures furnish an illustration of the sharp rise or fall in wages per hour, following the rise and fall of output.

Although it is with output that the differential rate is most closely associated, the principle is sometimes applied in other directions, and we may have a differential rate which follows variations in quality. Again, the basis may be one of accuracy, and, in this case, it may be found that the rate varies in correspondence with the percentage of error. Yet again, the rate may follow achievements in economical working, such as the avoidance of waste; the system has done useful work in this direction, especially in cases where the raw material was costly and where the difference between a reasonable and an excessive amount of waste would have meant the difference between profitable and unprofitable working.

The differential rate is used also as a time-rate. For instance, a man producing eight units per day may be paid 1s. per hour, and this time-rate may be increased to 1s. 2d. per hour if he succeeds in raising his output by 25 per cent.

The particular advantage to the employer in the use of this system lies in its powerful dual stimulus, resulting in a rapid reduction in the cost per unit of the manufacturing expense. Especially is the system valuable in obtaining the utmost output from expensive machinery, with heavy hourly expense-burdens, which must be worked to its full capacity in order to justify the purchase.

Under this system, too, by its very nature, the incompetent workman stands revealed much more clearly than under other methods of payment, since the difference between a poor and a good output is reflected in such a marked manner in the wages.

Another good feature of the differential rate is its flexibility: the employer can by its use apply stimulus in any desirable degree at any point in the scale of rates. He may, for instance, hold out very strong inducements for the poor workman to improve his output, but to one who has already attained a satisfactory production he may offer a special rate for another sort of efficiency, *e.g.* quality, accuracy, economy, etc.

The workman may well be satisfied with the differential rate, since he is amply rewarded for his energy by being paid both for an extra output and at a higher rate for the whole of the output. We are of course assuming that the rates have been fixed with fairness, for, though one may accurately fix a rate for a normal production, it is far more difficult to devise a scale of rates that will accurately reward the varying degrees of exertion. It is assumed, too, that the shop organization is good, *i.e.* that the raw material is of good quality and is supplied with regularity. Again, to give the workman a fair chance under this rigorous system, it is essential that the machinery and tools are kept in good condition.

It is particularly desirable, too, that the employer should be careful to establish his rates accurately at the outset. Owing to the rapid rate at which the men's wages advance, the effect of a too highly fixed rate is more severe than under the Halsey premium in which the employee is given only a portion of the gain induced by his exertion, or under the piece-wage system in which the employee is paid at the same rate per piece, whether his output be high or low. In a much sharper contrast would the effect of an excessive rate appear, if comparison be made with the Rowan premium, under which, after a 50 per cent. increase in output, the worker's incentive is rapidly diminished.

In its effect upon the inferior workman, the differential rate is very severe and has frequently been condemned for its harshness. The incapable worker is doubly penalised—first by a decreased output and secondly by a decreased rate. Although the harshness of the system may be mitigated by the adoption of a minimum wage, in the case of low earnings it is best to search out the root causes of the poor output. The man may lack proper training, his training may be more suitable for another position, or he may be faced with a task that imposes too heavy a demand on his physique. Again, he may be the victim of a foreman's prejudice, or ot a conspiracy among his fellow-workers, and other possible explanations will occur to one acquainted with conditions in the workshop. No employer should be content to allow any of his men to remain constantly at a wage-point much below the average. A condition of this sort should be looked upon as a defect in management and ought to be dealt with as such.

It has been insisted that this system is fair to the workman only when he is guaranteed a good supply of work and when he can proceed without hindrance. For these reasons the differential rate is much more suitable for repetition work than for work involving delay and experiment such as new or variable work and repair jobs.

It is not easy to compare figures as has been done in previous chapters, because there is no standard scale in use, —the differential rates being fixed according to the judgment of the employer. In spite of this, one may make a useful comparison with the straight piece-rate. Taking, as before, the standard time as ten hours, the basis rate as 10d. per hour, and advancing the basis wage of 100d. by 5 per cent. for each 10 per cent. reduction in the standard time, we obtain the following comparisons:—

	10 hrs.	9 hrs.	8 hrs.	7 hrs.	6 hrs.	5 hrs.
Straight piece-rate: wage per hour .	10·0d.	11·1d.	12·5d.	14·3d.	16·7d.	20·0d.
Differential piece-rate: wage per hour . . .	10·0d.	11·7d.	13·7d.	16·4d.	20·0d.	25·0d.

We now see that under comparable conditions the system may, for the workman, be the most remunerative of those hitherto examined.

To carry the comparison a step further, we add 10d. per hour for expenses, as in the earlier comparisons, and get the following totals of wages and expenses for the job:—

	10 hrs.	9 hrs.	8 hrs.	7 hrs.	6 hrs.	5 hrs.
Straight piece-rate: wage *plus* expense . .	200d.	190d.	180d.	170d.	160d.	150d.
Differential rate: wage *plus* expense . .	200d.	195d.	190d.	185d.	180d.	175d.

Thus, in this instance, this system is the more expensive for the employer, and at the point where half of the time is saved, it would be more expensive by 16·7 per cent. than the ordinary piece-rate.

We are now prepared to see that, if time is lost, the workman (in the absence of a guaranteed minimum) is worse off even than under the straight piece-rate. For purposes of comparison it is assumed that the basis wage of 100d. is reduced by 5 per cent. for each additional hour occupied in the performance of the task. Taking, as before, the standard time as ten hours and the basis rate of 10d. per hour, we obtain the following comparisons:—

Time taken . . .	11 hrs.	12 hrs.	13 hrs.	14 hrs.	15 hrs.
Wage per hour, straight piece-rate . . .	9·1d.	8·3d.	7·7d.	7·1d.	6·7d.
Wage per hour, differential piece-rate . . .	8·6d.	7·5d.	6·5d.	5·7d.	5·0d.

so that, if the workman exceed his standard time by 50 per cent., the differential rate, in this instance, is less remunerative by 25 per cent. than the ordinary rate.

If we examine the figures as they affect the employer, we find that, if time is lost, he loses to a smaller extent than under any of the systems already noticed. 10d. per hour is added for expenses, and the standard time is ten hours. The figures given are the totals for the job:—

Time taken . .	11 hours.	12 hours.	13 hours.	14 hours.	15 hours.
Straight piece-rate .	210d.	220d.	230d.	240d.	250d.
Differential piece-rate	205d.	210d.	215d.	220d.	225d.

so that in this instance, if a job timed at ten hours took fifteen hours to complete, the employer's cost of wages plus expenses would be less, under the differential rate, by 10 per cent.

CHAPTER VII

SCIENTIFIC MANAGEMENT

No book on methods of remuneration would be complete without some reference to Scientific Management, because the manner in which the workmen are paid is one of its dominant features. An attempt is made here to introduce the subject to the English reader who for the first time is studying remuneration systems. The writer is altogether indebted to the American experts for the following account, and he wishes particularly to acknowledge his indebtedness to the writings of the late Dr. Taylor (the founder of Scientific Management), to those of Mr. H. L. Gantt (who invented the Task-with-bonus system as an appropriate method of payment for use with Scientific Management), and also to those of Mr. F. B. Gilbreth, who has written a primer on the subject.

Perhaps one of the best definitions of Scientific Management, in relation to the wage systems, may be gathered from a comparison of its accompanying conditions with those characteristic of the older wage systems.

Under the older systems, when a premium or piece-rate is determined, it is based upon existing conditions. That is to say, the change is confined to the system of remuneration, *e.g.* from a time-rate to a premium or piece-rate. The change in the method of payment does not necessarily imply any alteration in supplies, machinery, tools, speed, processes, motions or quality. What is done is simply to pay in another form for work done under unaltered conditions.

Now the procedure under Scientific Management is in very sharp contrast. It starts with the theory that in the nature of things the average operative, lacking a scientific equipment, is "mentally incapable of determining the best way of performing even the simplest operation." So we have an elaborate reconstruction of everything that relates directly or indirectly to the article manufactured and the operations it undergoes. Everything goes into the melting-pot. The methods of scientific research are applied. First there is a minute study of each element in each operation or process. At this point the scientific attitude is critical and destructive, and everything that indicates waste of material or labour is eliminated.

It is then sought, by patient experiment and test, to discover ideal motions and processes, and thus to build up in minutest detail a perfected sequence of operations. Together with this goes a scientific study of the human factor, with special attention to the element of fatigue and with due regard to the need for rests.

Finally there emerges an approximately perfect method of performing an operation, with the most economical motions, involving the least strain, aided by an ideal arrangement of the bench or machine in relation to supplies.

A perfected process or operation having been obtained, the next step is to determine carefully, by means of a stop-watch, the time necessary to perform each element in the operation and to fix a standard time as the result of that observation. This standard time is repeatedly checked and tested, until at length a final time is reached representing the quickest possible performance for the standardised method. The next thing to do is to use the records of the times taken over the various parts of an operation and, from them, deduct a time for the whole operation.

Ultimately a standard time is reached for performing a certain series of operations, with stipulated motions and rests, in a definite sequence, with prescribed tools and appliances, with a careful carrying out of instructions in regard to speed, feeds, etc., and with a definite degree of quality and accuracy. The performance thus standardized is called the "task," as the term is used in Scientific Management, and it is for the accomplishment of this "task" that a differential rate or bonus is paid.

The employer may at first concede a more generous time than the standard, but it is laid down explicitly at the beginning that the standard must ultimately be accepted. At the same time it is announced that the standard time will not be changed, and the permanent standard is a notable feature of the system.

The "task" is by no means easy of accomplishment. It is expressly made difficult, and none but high-class men can perform it. The management, however, takes upon itself the liability of proving that the work can be done in the standard time, and that, too, without physical injury to the worker.

The men are not expected to perform the task without training. They are first carefully selected and then thoroughly trained by an expert instructor in everything that appertains to the doing of the work, even including the use of tables and slide rules. It is interesting to learn, too, that the cinematograph has been pressed into service to aid the men in their study of the proper motions. It should be noted that the instructors are not the foremen. The latter are free to concentrate upon the ordinary routine of the workshop.

Together with the reconstruction of manufacture there is an equally scientific reorganization of transport. The raw materials are regularly supplied at the most convenient time, and they have first been subjected to a searching inspection. It is customary under Scientific Management to appoint a "boss" whose special duty it is to perform these functions.

The "boss" and his men are liberally compensated for their energy and success in keeping the operatives well supplied, and it is to the interest of the "boss" to do his utmost to help every workman; for, in addition to receiving a definite bonus for each workman who succeeds in performing his work within the time prescribed, the "boss" is paid an extra bonus if all the operatives achieve their tasks.

An essential feature of Scientific Management is the Planning department, which, in addition to the normal functions of such a department (a description of which is outside the scope of this book), issues daily to each workman an elaborate schedule, mapping out the extent and sequence of the day's work, and furnishing, in minute detail, particulars of the tools and appliances to be used, and also giving him all possible aid by diagrams, tables, and other devices. This is done to prevent deviation from methods learnt during the period of training.

The schedule states separately the time and the bonus for each element in the operation, and thus the workman is enabled frequently to judge how his progress compares with the standard.

If a machine breaks down, or if there is a hitch in transport, that of course is regarded as being outside the schedule, and due allowance is made to the workman.

The wage-system generally associated with Scientific Management is the differential rate, as used by the late Dr. Taylor. The differential rate has been discussed in an earlier chapter. Its use in Scientific Management seems to be confined to the payment of a low rate for failure, *i.e.* for taking more than the standard time, or for producing work any portion of which is not of prescribed quality or accuracy. The low rate yields rather less than time-wage and is so calculated as to be unattractive even to inferior men. A high rate is paid for success, *i.e.* for the proper performance of the task in the standard time and without imperfections. In cases where the chief cost of production is that of machinery, or where severe manual labour must be combined with skill, a yet higher rate may be paid for specially intensified effort.

Where it is impossible to separate individual performances, a differential group rate is used, the shares of members of the group being governed by such considerations as class of work, intensity of effort, accuracy, general ability, etc.

We have elsewhere tried to prove that the differential rate is a very severe instrument, and it may readily be believed that it operates in a drastic way, when applied to a group, by bringing pressure to bear on the less capable members, who are given to understand by their fellows that they are either to attain an average ability or to leave the gang.

The following are some figures quoted by Dr. Taylor in illustration of typical results stated to follow the introduction of his methods :—

Cost of Production per Lathe per Day.

	Ordinary rate.	Differential rate.
	dollars	dollars.
Man's wages . .	2.50	3.50
Machine cost . .	3.37	3.37
Total cost per day .	5.87	6.87
	Five pieces produced.	Ten pieces produced.
Cost per piece . .	1.17	0.69

In this case the output was originally 5 pieces per day paid at 50 cents per piece. A differential rate was established, of 35 cents per piece for 10 per day, and 25 cents per piece if less than 10 were produced.

There appears to be a flaw in the statement of cost quoted above, since it shows the machine cost to be the same per day under the high production as under the low. It is the general experience that the work of organizing and maintaining a greatly increased production results in a higher machine cost per day or hour.

Another system of remuneration prominently associated with the American methods is the Task-with-bonus, which was invented by Mr. H. L. Gantt, who worked with Dr. Taylor for many years. The Task-with-bonus was designed to be a preliminary system, when conditions were not ripe for the differential rate. The temporary system, however, was so successful in its results, that it has established itself as a permanent method and threatens to supplant the differential rate.

The Task-with-bonus guarantees the normal time-rate and, in addition, for the achievement of the task under all its stringent conditions, pays a bonus which is usually a substantial percentage of the day-wage. The percentage varies greatly with the nature of the work and the demands made upon the physical and mental resources of the worker. For average conditions an addition of about 40 per cent. to the time-rate is given, but where severe bodily exertion is entailed another 10 per cent. or 20 per cent. is paid. Where delicate and expensive machinery is used, it may pay the employer to make the bonus as much as 100 per cent. A bonus of about 80 per cent. may be given in cases involving a high degree of physical effort combined with close mental strain.

The workman, on completing his task, receives a certificate from a responsible foreman, and each morning, as the result of a vigorous organization, and because rapid returns are essential to the maintenance of a constant stimulus, he is given a slip showing the result of the previous day's work as expressed in bonus. If the worker has failed to earn a bonus, the reason is stated.

The learner, while on probation, usually gets no more than time-wage, but, by way of encouragement, he may be paid a small bonus when, for example, the task has been done in the proper manner and strictly according to instructions, but not within the standard time. If the workman, after his probation, fail to accomplish the task, he is paid his time-rate and no more. This rule, however, is sometimes relaxed. There have been cases in which men were encouraged by bonuses for performances which, although not up to the task standard, were distinctly meritorious. Provided the general principle is maintained, such relaxations of rule are often expedient; and Mr. Gantt has contemplated their advisability in cases where manual skill and exertion are the main factors. If the employee fails again and again, and if there is no prospect of his succeeding, he is transferred to another position. Only those men are retained who are successful. The constant failure of one or more workmen under the complex conditions characteristic of Scientific Management would upset the delicate organization and act as a deterrent to the other men. More especially would this happen in shops where the processes are linked up with one another, and where delay at one stage reacts on all the other processes, and prevents the men from earning their bonus. It is said that the successful men are themselves insistent on this point and that they raise a clamour, if any condition arises, whether from defective transport, incompetent workmanship, or careless superintendence, which is inimical to their prospects of working closely to the schedule.

How does the workman come off under the Task-with-bonus system, if he improves upon the standard? It is claimed that this is a very difficult thing to do. The "task" is computed so closely that only men of exceptional strength or skill can surpass it. But the possibility is faced, and the worker who succeeds in improving upon the standard may be rewarded in a number of ways. Let us suppose that the standard time is ten hours and the bonus for success is 40 per cent.; and that the employee succeeds in performing the task, without deviating from his schedule, in eight hours. One way of rewarding him for doing this would be, still to pay him the standard time but to pay the bonus as 40 per cent. of the time actually taken:—

For the task.		For the improvement on task.	
10 hours at 10d.	=100 pence.	10 hours at 10d.	=100 pence.
Bonus, 40 per cent.	= 40 „	Bonus, 40 per cent. of 8 hours at 10d.	= 32 „
	140 „		132 „

For the standard performance the employee would thus receive 14d. per hour, for the improvement on standard, 132d. ÷ 8 = 16·5d. per hour; an increase in earnings of nearly 18 per cent.

Or again, supposing the payment to be on a piece-rate basis with a stipulated production as the standard, the employee may be paid the same piece-rate, or even a higher rate, for the units produced in excess of the standard. Possibly a higher rate may be given for the entire number of pieces. In this latter case we recognize the differential rate. Finally, special success may be rewarded by a post as instructor or foreman, at a wage still higher than the best efforts could procure under the ordinary method of payment.

When the Task-with-bonus, which is normally associated with a time-wage basis, is employed with a piece-wage basis, its use removes a fundamental defect in the piece-wage method, *i.e.* the absence of a standard of output. There would also be the advantage of differentiating between different degrees of failure to reach the standard, thus avoiding the dead level of a time-wage. But too much stress should not be laid on comparative methods of payment when the standard is not attained. The achievement of the task is the essential feature of the Task-with-bonus system, and that being so, no elaborate method of payment is devised to meet the case of failure. The writer has not come across any instances of the use of the Task-with-bonus combined with the Halsey premium or the Rowan premium. The latter systems might do well to borrow the idea of the high and difficult standard from the former, and to offer a special reward for special success.

Experience seems to have suggested that the differential rate, which in its early days was attached to Scientific Management, was far too drastic a method for the delicate period of change from a low to a high-speed production. It was also felt that the differential rate was intolerably severe in cases of failure to reach the standard; and, since permanent failure is not tolerated under Scientific Management, a complex rating that is used only for a temporary condition is clearly not an ideal method. It is obviously much more encouraging for the learner to know that he is certain of a time-wage, and this guarantee of a time-wage is one of the merits of the Task-with-bonus. To penalize the novice in the learning stage by a method of differential rating would seem to start the new system under conditions distinctly prejudicial to success.

Once the learning stage has been passed, however, this objection does not hold good, and there can, then, be no harm in introducing a differential rate, because it is a method of reward which readily suggests itself for meritorious performance, and which, as we have seen, pays not only for increased product but also an increased rate for the whole of the product.

The results of the operation of a thorough-going system of Scientific Management are claimed to be a greatly increased production and a greatly reduced cost. Figures are sometimes quoted showing a 200 per cent. increase in output! These results are accompanied, too, by a much higher wage for the employee. For the first time, also, we have a system that promises something approaching a foreknowledge of labour and expense costs—a welcome knowledge to a manufacturer. Again, it is claimed that, since the bonus is not paid unless the work has been inspected and certified to correspond with the standard, its quality is greatly improved. It is highly probable that the selection of specially fitted men produces a personnel of higher standing; and there is some reason to suppose that, owing to the particular manner in which the specially trained foremen are remunerated, to be noted in a later chapter, the supervision under Scientific Management is keener and more effective than under the more well-known systems. There is even a claim that the management is simplified; this may be true in regard to the supervision of foremen, but it is probable that anything approaching a truly scientific administration of a factory would scarcely be less complex than our present imperfect methods, which proceed largely along the line of least resistance.

One argument finding great support from the advocates of Scientific Management is stated somewhat in this way:—Under the old systems, so they say, the control of the rate of production and many of the general conditions were left in the hands of the employees. There was no rigid standard, whether of output or general shop administration, fixed by the management, and thus the men were able to exercise a more or less arbitrary control. In many cases, the employers, in the absence of a standard of measurement, could not detect even a loss of output. This was to be changed entirely, and the management was to exercise undivided control. This sounds somewhat like the substitution of one autocracy for another; it is very doubtful whether any remedy for the imperfections in factory management will be permanently acceptable, if it does not leave for the workers a sphere in which they can co-operate in some real way with the executive and be regarded, not as an aggregation of machine-attendants, but as a body of workers with corporate aims and sentiments.

It is claimed, too, that Scientific Management makes for improved relations and for the recognition of a common interest. The rate-fixing is scientific, and, consequently, the men's remuneration is just and uniform. There is no longer that haphazard element inseparable from the less precise systems. And, since the determination of a proper time is now altogether taken over by the management, there is not that temptation to "soldier" which has been the cause of so much trouble between employers and employed.

What are the advantages claimed for the employee under Scientific Management? Together with the increased wage there are: shorter hours, more sanitary and comfortable surroundings, improved health due to a more regular and purposeful life, and better opportunities for recreation and culture. The worker, as a result of the valuable training he has received, experiences a complete mental revolution; his increased concentration develops a higher degree of skill; he learns to co-operate intelligently with other workmen and with the management; he becomes ambitious and looks for promotion to the post of instructor, or foreman, or, in rare cases, to that of a scientific investigator. The general stimulus extends to his life outside the factory, and his general education improves in a measure impossible under the old system. Again, the scrupulous care of tools and machinery results in fewer accidents. If this last claim can be substantiated, here is something of a very tangible value; for workers, ever since the beginning of the factory system, have had to pay heavily in loss of life or limb for careless and inefficient control of machinery.

There has been a fierce controversy in the United States with regard to the merits of Scientific Management. It is asserted, for instance, that, however honourable may have been the motive of the pioneers in this field, unscrupulous firms adopt the new system and use it as a means of exploiting and exhausting the workmen. There certainly seems to be some ground for fear here, particularly if the men begin to dissociate themselves from their Trade Unions, and thereby lose that valuable asset of collective bargaining which alone gives them security and enables them to make a stand against an unjust wage-system or demand a proper share of the increased profits resulting from improved organization. It is said, too, that, while men receive increased wages and work shorter hours, yet, during their working hours, they are reduced to something like automatic machines. There is a lessening of interest owing to specialization. All the thinking and planning is done for them. No longer are they compelled to use initiative, to remedy errors, to foresee difficulties, and to act as their discretion dictates. It is asserted, too, by Trade Unionists, that the system prevents the proper training of apprentices. But on this last point there is abundant evidence that the Americans who practise Scientific Management are fully alive to the necessity for the training of boys, and that they are making elaborate studies in the direction of vocational selection. Again, it is objected that, while a man may double his output, he is very far from getting double remuneration. To this, however, there is the obvious answer that Scientific Management is costly to instal and operate. Moreover, the employers are surely entitled to reap their share of the decreased cost, as a reward for their intensified administrative work. One objection is that Scientific Management, in its relation to wage-systems, seems fitted rather for supermen than for ordinary mortals. And, if all firms demand super-men, what is to become of the average individual? The problem is not one which will become acute in our time, and we will leave it to the industrial captains of the future.

The claim of Scientific Management to fix a standard which can be attained only by exceptional men draws attention to the problem of increasing skill. Can scientific time-study really determine the limits of human achievement? Some of the experts are sceptical on this point. If, they say, the standard time is based on a future development of skill, the employee will presumably obtain an indifferent reward until that development arrives. On the other hand, if the rate be fixed without reference to future achievement, there is the possibility, arising perhaps out of the repetition week by week and year by year of some simple operation, that, with increasing skill on the part of the operative, his wage may reach an inflated figure. If, then, it is sought to reduce the rate, a vital principle of the differential rate or Task-with-bonus, *i.e.* that rates and standards shall be permanent, has been violated, and the system is laid open to the objection that, after all, it is associated with "cutting." The suggestion will be made that operatives would be well advised to regard this system, from this aspect, as critically as they regard the piece-wage method.

It would seem wise to accept the non-possibility of any such determination of the limitations of human performance. The employer should fix a standard that corresponds with a performance possible at the time. In addition, he may fix a point beyond which, in the ordinary course, the employee would obtain a considerably increased wage, and apply at that point a reducing scale. The graduated scale, whether expressed as discounts or as a differential rate, might be sufficiently drastic to prevent the employee earning an enormous wage, while it would not be severe enough to discourage his pressing forward to a continuously improving performance.

While only experts can instal Scientific Management, it is obvious that much can be done along these lines by the ordinary factory superintendent, whether as a preparation for the system or as an improvement upon existing conditions. It will be found valuable, for instance, to obtain returns of individual performances throughout the factory, to set tasks, to construct time schedules, and here and there, where conditions are highly favourable, to increase the routine element of the work by instruction in the use of tables and rules. Above all, the employer should proceed as far as possible in the direction of standardizing machinery, tools and utensils, motions and operations, shapes and weights of product, and particularly construction and sizes of packings.

It is interesting to learn some of the reasons given for the failures of Scientific Management. The chief cause seems to be a too rapid introduction of the system. It is necessary to go very slowly at first; there is much prejudice to overcome, and there are bad habits to reform, so that it is advisable to establish the new system step by step and stage by stage. For a long time the old and the new systems must operate together; and much firmness is needed to restrain the impetuosity of enthusiasts, who, eager to reap the large profits associated with the new science, would instal the system throughout a large factory within six or twelve months, when they should rather work patiently, establishing firmly the positions gained, before proceeding to the next stage, and they should be prepared to take five or even ten years over the work. To do this would be to spread out the initial charges for the installation of the admittedly costly system, so that, as soon as one portion of the work had been reorganized, there would be shown a steadily increasing credit balance as the result of the operation of the new method. It has been suggested that part of the cost of installation should be debited to the old system for its inefficient administration; but it would be difficult to persuade an auditor to give his consent for this to be done. Other causes of failure are the substitution of untrained for trained men and the greed and exploitation of employers who try to reap still larger profits by reducing the bonus. Again, it is stated that in some cases men have wrecked the system by demanding highly excessive bonuses. A change of management, too, may bring in new men who are critical of the new system or even antagonistic to it, and in such an atmosphere there is not much prospect of continued success. Finally, there are failures arising through loss of business, and these point to the desirability of extending the scientific re-organization to the sales department.

What is likely to be the attitude of the British trade-unionist towards the methods of Scientific Management? Our workmen have a strong dislike for any scientific study of motions or close measurement of output and effort. Yet surely they must recognize that nothing can arrest the progress of science, and that nothing will prevent the publication of the results of scientific research in the field of factory administration. It would be anomalous that science should be given a free hand elsewhere but excluded from the workshop. In any case, international competition will inevitably cause our workers to face the situation sooner or later. Our industrial future is largely bound up with our attitude towards the new science. It remains for the worker to co-operate heartily with the employer, and for the employer to give a generous share of the profit to the employee.

CHAPTER VIII

THE EMERSON EFFICIENCY BONUS

THE Efficiency bonus comes to us from America, and the honour of its successful introduction there is popularly attributed to Mr. Harrington Emerson, whose writings have largely furnished the material for this chapter.

This type of bonus seems to be more particularly associated with railway repair-shops, and with factories where it is extremely difficult to standardize materials, processes, and conditions.

The Efficiency bonus, as used by Mr. Emerson, has for its basis a guaranteed time-wage and sets up a definite standard of efficiency. For the attainment of this standard, which is called "100 per cent. efficiency," a bonus is awarded. The amount of the bonus is commonly 20 per cent. of the time-wage. Thus, if the performance of a task in 10 hours were the standard of efficiency, the employee would receive 12 hours' pay, if he succeeded in attaining the standard. Now a feature of this system is that the worker is encouraged by a graduated bonus-scale to persevere in his effort, even though he realizes that he is not going to reach the 100 per cent. point. This encouragement begins so soon as the worker improves upon a 66⅔ per cent. efficiency; that is to say, when, for example, he begins to improve upon the time of 15 hours for a 10-hour job. The stimulus at first is very small. Supposing the task to be performed in 14½ and 14 hours—efficiencies of 69 per cent. and 71·4 per cent.—the bonuses paid are approximately 0·1 per cent. and 0·4 per cent. If the time taken be 13 hours—76·9 per cent. efficiency—we get an advance to a bonus of 2 per cent. After this point, at 12½, 12, and 11½ hours—efficiencies of 80 per cent., 83 per cent., and 87 per cent.—the bonuses are 3·3 per cent., 4·9 per cent. and 7·6 per cent. respectively. At 11·1 hours—90 per cent. efficiency—the bonus is 10 per cent. From this point, for each additional 1 per cent. of efficiency 1 per cent. of bonus is paid, so that at 100 per cent. efficiency the bonus is 20 per cent., at 110 per cent. efficiency 30 per cent., at 120 per cent. efficiency 40 per cent., and so on.

It will be useful at this point to compare the Efficiency bonus with the Gantt Task-with-bonus. Although the Efficiency bonus is designed to be used under conditions which are characteristic of Scientific Management, the 100 per cent. standard is apparently by no means so severe or difficult of attainment as the "task." Mr. Emerson's system is so applied as to make it possible for a man with good average ability to attain 100 per cent. efficiency. The exceptionally able man, it is expected, will pass that point and go on increasing his wage. It may well happen that a man who only just manages to accomplish the "task" under the Task-with-bonus method is able, with the same effort and skill, to reach the point of 110 per cent., or even 120 per cent., under the Emerson system. At the same time, it may easily happen that the employee's wage for the "task" would be fully equal to that earned at 120 per cent. efficiency under the Emerson system.

We now see that the Emerson system is generally more adaptable; for it takes men as they are and brings them into contact with a stimulus which successfully acts on men widely differing in skill and energy. For the latter reason the Efficiency bonus is more suitable for the average factory, while the Task-with-bonus, with its rigorous "task" standard, is rather more suitable for specialized work for which carefully selected men have been highly trained. These men are removed, if after a period of probation they do not habitually complete the task. There is no such encouragement for them in the first stage of their efficiency, no such toleration of a permanent failure to reach a 100 per cent. standard, as is offered under the Emerson system.

In order to cut out a large number of calculations in operating this system, it is necessary to take the sum of the hours worked and the sum of the standard times over any given period—for a week or a month as the case may be—and arrive at an average percentage of efficiency. Thus, if a man works 200 hours in a month and completes a number of jobs the sum of whose schedule times is 220 hours, his average efficiency is 110 per cent.

It is stated that another advantage arising from calculating the average efficiency for a period and not for each job lies in the disappearance of mistakes made in fixing the time standard. The generous standards pay for the poor standards. So runs the theory. But the danger here is in slurring over errors and treating them altogether too lightly. In any case, the job records should be scrutinized separately in respect of the standard and the actual times.

In the case of long jobs which may be partly finished at the ending of the bonus period, some awkwardness arises in the calculation of percentage efficiency. To meet this, it is desirable to fix standard times not only for the jobs but also for the operations. Thus, in such a case, it might be said that, though a man had not finished a particular task, he had worked three hours on it and turned out work of the value of four standard hours. This portion of the work could then be treated as a separate job, and the bonus account closed accordingly. Failing this method, the hours spent on unfinished work might be deducted from the efficiency account and carried forward to the next period.

Though it is quite true that a man is rewarded for even a modest degree of efficiency, yet under this system a man is not allowed to remain permanently at a very low point in the efficiency scale. He is taken in hand and trained. If he is not susceptible to training, he is transferred to a more suitable position.

For the employer, the main advantage of the Efficiency bonus is to be seen in a lessened cost, and, further on, some figures are given in support of this contention. It is claimed, too, that delays are cut out, and that production is increased. There is also (so it is alleged) a decrease in waste, naturally following upon an increased concentration on the part of the workers. But, if the question of waste be a serious one, it is well to devise an efficiency scale with the special object of devoting attention to its reduction. For it is an advantage of the Efficiency bonus that the basis of the scale need not be that of the time taken to do the work. For instance, in some engine repair-shops, the efficiency percentage scale has been used to encourage the men to complete repairs not only within a certain time but by a specified date, and to reach various stages of the work at the intermediate dates stated in the schedule. Production, quality, accuracy, cost of repairs, etc., all these may be made to yield standards of efficiency, and it is possible to combine two or more such factors in an efficiency scale. For example, the items of production and avoidance of waste may be combined with advantage. Again, another combination useful in the railway world, is to devise a scale which will give bonuses for punctuality in running to scheduled times and, at the same time, for economy in the use of fuel.

All those advantages commonly claimed as resulting from the employment of better trained men are to be seen in the operation of the Efficiency bonus. There is also the feeling that the employee's improved skill is the outcome of a more humane and generous system than that of the Task-with-bonus. Men are taken as they are; they are trained and, with few exceptions, they respond to the training. The result is seen in a general improvement of the mentality of the man. The improvement exercises a beneficent influence upon his private life, and thus, in the Efficiency bonus, we see an agency that is not concerned solely with the selection and training of super-mechanics, but which, owing to its recognition of inherent variations in ability, extends its improving and elevating influence, without harsh discrimination, to the average worker.

The Efficiency bonus may be used, also, to embrace those workers who, though not actually engaged in direct production, are yet able to exercise an influence upon the output or its quality. Such are the men who deliver the raw material to the proper place, or collect finished work; and who, by attention and despatch, have it in their power to make it easier for the shop in general to attain a higher degree of efficiency. Others are stokers, enginemen, mechanics, belting-men, and greasers, all of whom are able to forward or retard the general efficiency. For these indirect workers a special calculation may be made, based upon the average percentage of efficiency of the whole shop. For example, this average may be 90 per cent., and the indirect worker may be given a bonus of 1 per cent. of his wages for each 10 per cent. of the shop efficiency. Again, inspectors of finished goods may work to an efficiency scale, the basis of which is the percentage of defects discovered. Storekeepers and stock-keepers, too, may be rewarded by an Efficiency bonus whose basis is the accuracy of record or the maintenance of proper stocks. So flexible is the system, that in some such way everyone in the establishment, from the highest to the lowest, can be stimulated to take an interest in the general efficiency and help to make it greater.

The employee's advantage is to be found in the certainty of a higher wage, if he is of average competence. There are splendid opportunities for training, which, taken advantage of, result in an ever-widening efficiency. As under the Task-with-bonus system, the man of special skill and ability will receive a commensurate reward. The worker handicapped by nature will find that even he is recognized as being in a state of potential efficiency. He is encouraged to make the most of himself, and often his whole life is brightened by a successful effort to raise himself out of the rut of a day-worker.

It will be found a distinct advantage, if the worker can be notified daily of the amount of the bonus, and if the bonus can be paid weekly. To this end, it will be necessary to determine standard times for quite small portions of his work. The time and trouble will be well repaid; for prompt information and frequent payments create conditions favourable to the working of a bonus system. Men insensibly relax their efforts if the reward be long deferred, but a frequent bonus applies a constant stimulus.

It would be well, also, to avoid anything in the nature of "cutting" such as would result from decreasing the time-standard, and thus making it more difficult to get within the area of efficiency that will yield a bonus. The newer systems, happily, are not so closely associated with rate-cutting as is the piece-wage system, and it behoves all, who are concerned with the attainment of permanent good relations between employers and employees, to attempt so to determine the time-standards at the outset, that they will remain for a long period without change. Nevertheless, when the men are afforded new facilities in the shape of improved tools and machinery, or of improved organization, the employer should surely reap the greater share of the advantage. Then, of course, it is wise promptly to alter the time-standards. If there be delay, the men will have become accustomed to a higher wage under the advantageous conditions, and the change will be difficult to accomplish without some degree of friction.

It is interesting to note how the employee's earnings advance under this system:—

Standard =10 hours, 100 per cent. efficiency.
Time-rate=10d. per hour.

Time taken . .	15 hrs.	13 hrs.	11 hrs.	10 hrs.	9 hrs.	8 hrs.
Percentage of efficiency . .	66·7	76·9	90·9	100·0	111·1	125·0
Earnings per hour	10·0d.	10·2d.	11·1d.	12·0d.	13·1d.	14·5d.
Increase in hourly earnings . .	...	2%	11%	20%	31%	45%

After the early stages of efficiency have been passed, there is a rapid advance in the percentage of increased earnings. The first two hours' reduction in standard time yields only 2 per cent. increase in earnings per hour, but the second two hours bring the percentage up to 11, and the third to 31.

Turning to the employer's case, and using the same basis, with an expense charge also of 10d. per hour, we obtain the following figures:—

Time taken . .	15 hrs.	13 hrs.	11 hrs.	10 hrs.	9 hrs.	8 hrs.
Employee's earnings . . .	150d.	133d.	122d.	120d.	118d.	116d.
Expense charge .	150d.	130d.	110d.	100d.	90d.	80d.
Wage *plus* expense	300d.	263d.	232d.	220d.	208d.	196d.
Decrease in cost .	...	12·3%	22·7%	26·7%	30·7%	34·7%

It will be seen that, unless the time is considerably reduced from fifteen hours, the employer's gain is greater than that secured by the employee, if we speak in terms of the percentage of decrease in cost on the one hand, with the percentage of increase in earnings per hour on the other.

But if the time is reduced to nine hours, the employee's earnings per hour wlll increase by 31 per cent., while the employer's cost will decrease by 30·7 per cent. At eight hours the difference is more striking, for the comparative figures are then 45 per cent. and 34·7 per cent.

The comparison of this and the Gantt bonus with the older systems is made more complicated owing to the difficulty of finding a basis to work upon. Everything depends upon the extent to which Scientific Management conditions have been established, and upon the rigour of the standard set. The present writer has consulted an American efficiency engineer in his endeavour to deal with this problem. The advice received was to reckon a fifteen-hour performance for a ten-hour standard (100 per cent. efficiency) as equal to the effort displayed under normal time-wage conditions. Then the opinion was expressed that the Halsey and Rowan systems should be considered to exact as much work at fourteen hours, as the Emerson does at fifteen. The Gantt system requires as much in eight hours, as the Emerson does in ten hours for 100 per cent. efficiency or in fifteen hours for 66⅔ per cent. efficiency; or, as much as the Halsey and Rowan require in fourteen hours. Again, the eight-hour standard under the Gantt system is equal to the normal piece-work standard at twelve hours.

An interesting variant of the Emerson scale is recommended by Mr. C. E. Knoeppel, an American efficiency engineer, who suggests more generous treatment during the early stage of progress up the efficiency scale.[1] At 100 per cent. he gives 25 per cent. bonus, as compared with the 20 per cent. given by Mr. Emerson. The median stage—90 per cent. to 100 per cent. efficiency—carries the Emerson rates. Mr. Knoeppel considers that the giving of the additional 5 per cent. bonus at 100 per cent. efficiency is justified, because it stimulates the employee to make a special effort to attain the standard. To have reached say 98 per cent. is to earn a bonus of 18 per cent., and the knowledge that, if one could but attain a stage of efficiency that is no more than 2 per cent. higher, the bonus would be increased by 7 per cent., is undoubtedly a strong additional incentive to make the final effort to reach the goal. One can readily see, too, that it may be advisable to offer greater encouragement in the early stage of efficiency than is offered by the Emerson scale which makes a man gain 7 points of efficiency, *i.e.* attain 74 per cent. efficiency (thereby reducing the time from fifteen to thirteen and a half hours, *i.e.* by 10 per cent.), before giving him 1 per cent. bonus. The Knoeppel scale gives 2·6 per cent. bonus for the same effort.

---

[1] *Engineering Magazine*, November 1914.

The following is an approximate comparison of the Emerson and Knoeppel scales:—

Percentage of efficiency.	Percentage of bonus.	
	Emerson.	Knoeppel.
68	·04	·5
70	·22	1·0
72	·55	1·7
74	1·0	2·6
76	1·6	3·3
78	2·4	4·0
80	3·3	5·0
82	4·3	5·6
84	5·5	6·5
86	6·8	7·5
88	8·3	8·5
90	10·0	similar to Emerson.
92	12·0	
94	14·0	
96	16·0	
98	18·0	
100	20·0	25·0
105	25·0	30·0
110	30·0	35·0
120	40·0	45·0

There is one important recommendation to make to those who are operating Efficiency-bonus schemes, and that is, to supply tables to the bonus-workers which will show them exactly the units of work per hour and the amount of bonus per hour that correspond to the various points in the efficiency scale.

Undoubtedly a worker is much encouraged, if he is enabled to measure his progress easily and express it in terms of wages per hour. Mr. Knoeppel lays stress upon the advisability of giving the employee these tables, and it would be wise to adopt a similar expedient in the case of the other wage systems, varying the information to suit the particular system but maintaining the principle of informing the workman of the result, as stated in wages per hour, of each little improvement on the normal production. Thus, under the piece-wage and differential-rate systems, the tables would show a scale of units of output per hour, or the time per unit, along with the corresponding wage per hour. Under the Halsey and the Rowan systems, the information would reveal the increased wage per hour for the successive reductions in the standard time.

CHAPTER IX

FOREMEN'S WAGES

UNDER the time-wage system, the foremen usually are paid a fixed wage per week or month. In addition, it is not infrequent to give them a financial interest in the output, such as a bonus on production beyond a stipulated standard, or a commission on the sales, and there to let the matter rest. There are many reasons, however, which make it desirable that the foremen's remuneration should be on a more complex basis, if regard is to be paid to an all-round efficiency of supervision. For, on the simple basis of a fixed wage, plus a bonus on output, the foreman finds himself directly concerned with only one kind of efficiency. He may, it is true, have aspirations in the direction of general efficiency, but, if he be remunerated specially for looking after one aspect of shop management, it is probable that he will neglect to give the requisite attention to the others. It would be wise, perhaps, at least to extend the foreman's direct interest to a reduction of the general labour cost—not overlooking the cost of miscellaneous labour—and to economy in the use of materials and stores. To obtain a basis for calculating the reductions in labour costs, it will be found useful to keep careful records of the time-workers' performances and to establish a standard time for each job. The standard may represent the average time hitherto taken in doing the work; possibly it may be a little more or a great deal less. The manner of fixing the standard is largely contingent upon the employer's opinion of the capacity of the shop, and of the extent to which the actual output falls short of the maximum. The foreman will then receive a definite percentage of the saving. It is advisable, at the outset, to fix a limit beyond which the foreman's bonus—both for saving in labour cost and for excess of output beyond the standard—will be calculated as a decreasing rate. Thus will be avoided the necessity of a frequent revision of standards. The cutting of rates is, of course, as discouraging to a foreman as to a workman, and equal care should be taken so to arrange the basis of payment as to avoid a periodical adjustment.

To give the foreman his direct interest in stores and materials, it will again be necessary to establish standards. This standard in this case will relate to the consumption per unit of output of, say, the six most important items. As in the case of labour, the standards should not be fixed by a rough estimation but should be determined after careful records have been taken, and consideration given by the employer to the extent of the improvement to be expected under the new stimulus.

It may be advisable, also, to consider the giving to a foreman of a bonus which decreases in inverse ratio to the quantity or value of goods rejected either for poor quality or inaccuracy. Again, a bonus scale could be arranged to give the foreman a direct interest in the accuracy of the packers' work.

If the employees are piece-workers, the foreman will be more likely to receive a bonus based on output than when he is in charge of day-workers. While it is true that the stimulus thus given to the foreman is a strong one and lessens the amount of supervision necessary on the part of the employer, yet the same restricted attention is noticeable even here, and unless the foreman's interests are put upon a broader foundation, and unless his financial gain from mere output is lessened, there is grave danger of his whole energy being concentrated on "driving" his men.

Where it is not desirable to inform the foreman of the amount of production, it may be well to substitute, for the output bonus, a percentage of the total wages earned by the men, provided that the foreman alone does not furnish the figures on which the men are paid. If this be the case, some independent check is advisable. The foreman cannot be expected to be, at one and the same time, an excellent foreman and an accurate clerk. Supposing then that the foreman is remunerated in the various ways described above, there is still one interest overlooked. How is the foreman to be directly interested in the weak worker, to avoid bullying him, but rather to help and train him? American systems meet this difficulty by giving the foreman a higher bonus rate, if all of his workmen succeed in accomplishing the task.

Under the Halsey and the Rowan systems the foreman would naturally receive a standing wage, with the addition of a percentage of the value (as expressed in wages) of the time saved. Here, too, we see the same narrowing of interests, and here, also, should be introduced the other bases of payment described above, viz. economy in labour, materials, stores, etc.

We now come to the foreman's payment as it is arranged under the Cost premium, and it is under this system that there seems to be a distinct hope of finding a satisfactory basis of payment. The foreman will get the customary fixed time-wage, a bonus on output, and, in addition, a definite percentage of the aggregate saving in cost. In this way the foreman's financial interest is of a threefold aspect, *i.e.* he is concerned (1) with output, (2) with economy in labour, and (3) with economy in various other items entering into the prime cost. In other words, a large part of his remuneration depends upon his success in stimulating the general efficiency.

The items which make up the foreman's wage will vary with the comparative values of output, of economy, etc., in his particular factory. In some places emphasis is laid on output, in order perhaps to employ expensive machinery to its fullest capacity. In others, again, the question of waste in material and labour is more prominent. As an experiment, the foreman's wage may be composed of three equal parts, viz. (1) standing wage, (2) output bonus, and (3) a percentage of the Cost premium.

When the foreman is to receive a share of the Cost premium, he should not be allowed, without some measure of control, to estimate any of the items in the standard cost; otherwise, he may be tempted to inflate the figures beyond a reasonable amount.

In some cases the item of materials is not included in the standard cost because of the constant fluctuations in value, and the dislike of fixing a standard price. But in paying a foreman, no system which does not compel his close attention to the possibilities of economy in this direction can be considered ideal.

Under the Gantt bonus, the foreman again receives a standard wage as basis, but, in addition, he receives not only a bonus for each workman who earns the bonus, but also an extra bonus, if all the workmen are successful in completing their tasks. We see here a very keen incentive resulting in a close and generous supervision. It is claimed that the dual nature of the bonus makes the foreman concentrate his attention on weak workers. Again, it is asserted that this special attention given to the poor workers creates a good feeling and a sense of having a common interest. Certainly, this dual interest is all to the good in that it prevents a foreman being satisfied with anything but the maximum efficiency and discourages that favouritism which fosters the strong and ignores the weak. It has been pointed out, however, that it would be very discouraging to a foreman to lose the second bonus because, perhaps, one man out of thirty had failed to achieve his task. To meet such a case, the second bonus is sometimes made proportional to the number of men who succeed in reaching the standard. Thus the foreman is encouraged, at every stage in his endeavour, to raise the general efficiency. There is not that sharp difference in the foreman's earnings just for the defection of one man.

Coming to the foreman's reward under the Efficiency bonus, we find that the usual standing wage is paid as a basis, and that, in the simplest form, the foreman is given a percentage of the aggregate of the bonuses earned by the entire shop. In the more complex cases, he is paid a bonus which varies with the average efficiency percentage of the shop. Further, the efficiency percentage on which he is paid may be the average of various sorts of efficiency, for, as pointed out in the chapter on "Efficiency Bonus," the efficiency scale may be used for many purposes other than the sole attempt to decrease a standard time. To come more closely to the subject, let us assume that the average percentage of efficiency of the entire shop, in relation to the standards set, is 100 per cent. For this, the foreman may get 20 per cent. bonus on his own wage—a bonus rating which is perhaps identical to that of the men's rate. But suppose that only part of the shop were working under the bonus system! It is then obvious that some inducement must be held out to the foreman to increase the number of men working under this system, otherwise, the foreman may earn an extra 20 per cent. simply by looking after a few men and ignoring the others. To meet such a case as this, the foreman's financial interest may be put on a dual basis, *e.g.* he may be given 10 per cent. bonus for 100 per cent. efficiency of the schedule workers and a further 10 per cent., if all the men successfully work to schedule.

In Chapter VIII. a scale is given which shows the percentage of bonus for the various percentages of efficiency, and it is sometimes found convenient to use a similar scale for the foreman, with the possible modification that the foreman's scale is in two divisions as outlined above, an equal reward being given for each of the two items. If it is desired to emphasize one of these items, it can be arranged, for example, for efficiency in working to schedule and efficiency as determined by the extent to which the work in the shop is done under schedule conditions to be paid in the ratio of two to one. In this case the foreman is paid :—

(1) For 100 per cent. efficiency in working to time standards—

⅔ of 20 per cent. . . . 13·3 per cent. bonus

(2) For 100 per cent. of the shop time spent under schedule conditions—

⅓ of 20 per cent. . . . 6·7 per cent. bonus

The foreman's scale should show a similar ratio throughout :—

	No. 1 basis.	No. 2 basis.
66⅔ per cent. efficiency	nil	nil
70 " "	0·15 per cent. bonus	0·07 per cent. bonus
75 " "	0·87 " "	0·44 " "
80 " "	2·18 " "	1·09 " "
85 " "	4·11 " "	2·06 " "
90 " "	6·7 " "	3·3 " "
91 " "	7·3 " "	3·7 " "
92 " "	8·0 " "	4·0 " "
93 " "	8·7 " "	4·3 " "
94 " "	9·3 " "	4·7 " "
95 " "	10·0 " "	5·0 " "
96 " "	10·7 " "	5·3 " "
97 " "	11·3 " "	5·7 " "
98 " "	12·0 " "	6·0 " "
99 " "	12·7 " "	6·3 " "
100 " "	13·3 " "	6·7 " "

To prevent the foreman, in such a case, from being tempted to concentrate on the No. 1 basis and ignore the No. 2, it is expedient to make a rule that an efficiency as low as 33⅓ per cent. on the No. 2 basis would cancel, or lessen to some considerable extent, the bonus earned under No. 1. Or, if the efficiency began to fall below 66⅔ per cent. on the one, the percentage of efficiency ranking for payment on the other basis could be reduced to a corresponding degree.

Here are shown two bases of rating for the foreman's bonus, but there is no reason why three or even four bases should not be adopted. It may be advisable to do this, utilizing the Nos. 3 and 4 bases for cost and waste standards and giving bonus percentages varying in proportion to the estimated value of these items. A further elaboration may be made by creating standards for each class of expense. It would not be necessary to make a separate scale for each class. To arrive at the average efficiency of all the classes of expense, the efficiency percentage of each class could be multiplied by a figure indicating its relative importance, thus assuring to each class its due attention, *e.g.* :—

No. 1 class (6 units)	. 67 per cent. efficiency	average efficiency 75 per cent.
No. 2 „ (5 „)	. 70 „ „	
No. 3 „ (3 „)	. 36 „ „	
No. 4 „ (4 „)	. 100 „ „	
No. 5 „ (2 „)	. 120 „ „	

Unless, under the Efficiency bonus, there is some such extension of the foreman's interest as outlined above, it is easily conceivable that the system of remunerating the foreman is not superior to that used under the Cost premium.

CHAPTER X

PROFIT-SHARING

ALTHOUGH, strictly speaking, Profit-sharing may not be a method of industrial remuneration, yet its connection with our subject is sufficiently close to warrant some notice of the principles underlying profit-sharing practice.

Profit-sharing, in the technical sense of the term, is the giving to employees a share in the profits of the industrial concern, in addition to their ordinary wages. In the same technical sense, it is essential that the basis of sharing shall be fixed beforehand—stated more or less in the form of an agreement—and that the wages to which the share of profit is added are the standard wages of the district.

The fund from which the employee's share is allocated is the net profit that remains when, from the gross profit, are deducted salaries, rent and rate charges, taxes, and all other kinds of administrative expenses, together with the customary interest on capital.

Further, although there is naturally a formal agreement in most Profit-sharing schemes, yet rarely is the bonus granted as a matter of legal right—it being almost invariably of the nature of a voluntary gift, continued or discontinued, after perhaps an interval for notice, at the employer's pleasure.

As may be expected, there is considerable variation in the proportion of profit distributed to the employees and that retained by the employer. It is common to allot a fixed share of the profit made in excess of the average for a term of years preceding the adoption of Profit-sharing. Sometimes greater generosity is shown and a fixed percentage of the whole of the profit is given. More rarely, the participation of the profit-sharer stops at a certain point, *e.g.* the employees are awarded half the profits but receive a maximum reached when the rate of profit is 10 per cent.

Again, there are cases where the participants are given a differential share of the profit, following the rise or fall of the profit fund. Or, again, the percentage of bonus on wages is identical with the percentage of net profit on capital.

In the case of some gasworks schemes, the bonus is paid according to a scale which ascends, as the price of gas is reduced. From the Board of Trade Report on Profit-sharing (1912) is selected a typical example of such a scale:—

SCALE OF BONUS.

If the price of gas is at or above 3s. 1d. per 1000 cubic feet—no bonus.

	s.	d.					
At	3	0	per 1000	cubic feet—	bonus	¾	per cent.
”	2	11	”	”	”	1½	”
”	2	10	”	”	”	2¼	”
”	2	9	”	”	”	3	”
”	2	8	”	”	”	3¾	”
”	2	7	”	”	”	4½	”
”	2	6	”	”	”	5¼	”
”	2	5	”	”	”	6	”
”	2	4	”	”	”	6¾	”
”	2	3	”	”	”	7½	”
”	2	2	”	”	”	8¼	”
”	2	1	”	”	”	9	”
”	2	0	”	”	”	9¾	”

and so on.

Thus, for each 1d. per 1000 cubic feet by which, through economical working, the price of gas is reduced, the employee is paid ¾ per cent. bonus on his wages. It should be explained, in passing, that it is only by reducing the price of gas that a gas company, whose typical scale is shown above, is allowed by Act of Parliament to pay increased profits. In the case under notice, for each reduction of 1d. per 1000 cubic feet in the selling price, the shareholders become entitled to 2s. 8d. per cent. additional dividend; on the other hand, they suffer a reduction in the dividend of 2s. 8d. per cent. for each 1d. per 1000 cubic feet by which the price is raised.

In some instances the bonus is given in the form of an equivalent of the wages earned for a stated number of weeks.

Occasionally, (although this is outside Profit-sharing as strictly defined), the employee's share is determined arbitrarily by the employer, who takes into consideration each man's value and behaviour.

Employees usually share in ratio to their earnings, from which, for the purpose of calculating the bonus, overtime, excess of piece-wage over standard wage, and special payments are generally excluded.

It does not follow that, where Profit-sharing is practised, all the employees in the establishment participate. Discrimination is exercized in many cases, and the records show that, on the whole, in schemes operating in Great Britain, there are fully as many non-sharers as sharers.

But there are many cases where all the employees share without distinction. In others, there are various qualifications to be attained before participation begins. For example, an employee must not be under a certain age, or he must have been employed for a stated number of years. Again, participants may be arbitrarily selected by the employer; or participation may depend upon the signing of a contract of service. This last stipulation, a characteristic of the schemes of some gas companies, generally carries with it a proviso that, during the contractual period, wages must not be reduced. Many gas companies also stipulate that, below a certain maximum of absence through sickness, there shall be no deduction in the amount of profit bonus.

In the majority of cases, the bonus is paid entirely in cash; in other cases, part of the bonus is given in the form of shares, and part is allocated to a provident fund. Somewhat less frequently, part is paid in cash, and here again, part is retained for "provident purposes"; also part may be paid in cash and part in shares, or the whole may be paid in shares. This capitalization of the bonus is becoming increasingly popular and is characteristic of the schemes operating in gas-works. Again, all of the bonus may be paid in the form of shares, until the employee has a prescribed amount to his credit, and, after that point, the bonus may be paid partly in cash and partly in shares. In a few cases, the firm retain the whole of the bonus and apply it to a Thrift, Provident, or Pension fund. With shareholding schemes, there may be an option in some cases in regard to the capitalizing of part or the whole of the bonus. But there are some schemes where this option is not given, and where share-holding is the essence of the scheme.

The particular type of scheme that encourages or stimulates shareholding leads to some very important results; for not only are the workmen given the opportunity of becoming shareholders, with a measure of control in the business, but some schemes even provide a seat on the directorate for an elected employee shareholder. In some instances, through the gradual accumulation of capital and control, the shareholding employees have eventually become owners of the business! The idea of ultimately granting a partial or a complete control to the employees has been in the minds of not a few firms when inaugurating their Profit-sharing schemes. It must be remembered, however, that not all businesses can assimilate the additions to capital account that result from the issue of shares to employees. Again quoting from the Board of Trade Profit-sharing Report: "One of the managing directors of Messrs. Clarke, Nickolls & Coombs, Ltd., who have in the last twenty-two years [1890–1912] paid to their workpeople in bonuses a total of more than £172,000, remarks as follows:—'I wonder how Sir George[1] would deal with such a business as ours, where, during the sixteen years [1890–1906] our Profit-sharing scheme has been in force, we have paid in bonuses more than twice the amount of our ordinary capital, and we couldn't, if we wanted to, find employment for such an accumulation of capital as these bonuses represent. With a gas company, which is always increasing its mains and adding to capital account, it is different. We want to keep our capital account as low as possible.'"

---

[1] The late Sir George Livesey, who had been chairman of the South Metropolitan Gas Company.

There are many important testimonies to the advantage of Profit-sharing from the employer's point of view; and here let us note that the most successful results have been obtained in those schemes in which shareholding by employees is an essential feature. Dr. Carpenter (chairman of the South Metropolitan Gas Company), speaking at Oxford in November, 1911, when he advocated the claims of industrial co-partnership as a remedy for industrial strife and disaffection, said: "For twenty-two years we have had unruffled industrial peace. Our men do their work with goodwill and intelligently enter into the requirements of their duties. . . . We get the use of our men's brains as well as their muscles." (See also, Note on p. 107.)

There is abundant testimony that Profit-sharing leads to greater harmony in industrial relations.

The testimony to increased efficiency is also met with, but is not so emphatic. Usually the work is done with keener interest. There is also a claim here and there that the system results in economy in the use of material, reduction in cost, and improvement in quality of product. "Sir George Livesey was always of the opinion that considerable monetary value attached to the goodwill of employees; and this value was now being reaped in the shape of better carbonizing results, reduction of working costs, and zealous attention to the requirements of consumers" (Report on Profit-sharing, 1912, p. 70). It is asserted, too, that the sense of loyalty and responsibility is deepened, and corporate sentiment becomes a living force.

The advantages to the employee are substantial. In the first place, there is a distinct and appreciable addition to wages, the average bonus ranging from 6 per cent. to 7 per cent. of the wage; then there are many excellent facilities for the practice of thrift; but most important of all, is the opportunity for investment in the undertaking, with the raising of the status of an employee to that of a shareholder and co-partner. He may, in rare cases, even aspire to become a director. The daily work is performed with a new zest and interest, together with a feeling of co-operation and partial control. The whole mental horizon of the workman is widened, and his entire life may be lifted up with the new opportunities for recreation and culture afforded him by his improved social position.

The conditions under which the employee works now, for the first time, come under his jurisdiction; for, in a large number of Profit-sharing schemes, there are joint committees of employers and employed at whose meetings all grievances may be ventilated.

There remains, however, a difference of opinion as to whether the division of profit is on a fair basis. Again, Profit-sharing, if it be viewed as a method of industrial remuneration, is open to all the objections urged by the experts against the old wage systems. For instance, there is no task or standard of attainment for the individual, and there is no calculation of efficiency values. The practice of giving a uniform reward keeps the average of efficiency at a low level. The bonus, averaging 6 per cent. to 7 per cent. of the wages, is not high enough to induce men to give of their best. There is no attempt to associate the bonus with Scientific Management conditions. Employers say, also, that too much emphasis should not be placed on the success of schemes working in gas-works, where a monopoly exists, conditions of trade do not fluctuate, profits are regular, and the problems of manufacture are not so evident. On the other hand, it is claimed that gas companies are meeting with increasing competition from electric light and power companies, and that a sharp rise in the price of coal may, at any time, make it difficult to maintain a profit fund. The modern manufacture of gas is a very complicated matter, altogether different from the simple process the uninformed man imagines it to be.

What are the obvious disadvantages from the point of view of the worker? He is not paid for his individual output; the efficient worker suffers for the less efficient; the profit-fund, too, is affected by the fluctuation in the prices of raw material and by a variety of economic forces; these things being outside the worker's control, their action and reaction tend to discourage the worker. There is also the constant danger that the standard rate of wage will not be maintained, or that conditions may be imposed which virtually lower the standard rate by increasing the effort or by lessening the facilities.

It is gravely open to question whether the worker stands to gain more by Profit-sharing than by Trade Unionism and its instrument of collective bargaining. The latter is placed as an alternative, because the history of Profit-sharing shows that Profit-sharing schemes tend to dissociate men from the Trade Union world. Again and again, in the study of Profit-sharing literature the writer has met with the frank admission, on the part of the employers, that they hoped, by introducing the profit-bonus, to secure as one of their benefits, the detachment of men from their Unions and the consequent decline of Union influence.[1]

---

[1] Mr. Theodore C. Taylor, M.P., who enjoys a unique experience of Profit-sharing and Labour Co-partnership, has said that "Profit-sharing to be fully efficient must, on the employer's part, proceed from altruistic and not selfish motives."

There is little doubt, too, that the expectations of the employers have been in part fulfilled. Profit-sharing has a disintegrating influence in the labour world. How readily can this be recognized in those schemes, which carry the obligation to sign contracts of service expiring at different dates and so debarring employees from full and unreserved participation in the activities of their Unions! It is but fair to add, however, that where employers have stipulated that their workers shall be non-unionist, or, at least, that they shall not participate in a general strike, it is not unknown for the employers on their part to undertake to refrain from joining in a general "lock-out" or to abstain from joining an employers' federation.

The history of Profit-sharing in Great Britain contains many instances of failure, since more than half of the schemes started have been abandoned. The cause of failure is in some cases alleged to be the falling off in trade. This particular cause, it should be noted, is not likely to affect monopolies like gas companies. Failure has also been caused by the apathy of employees, the dissatisfaction of employers with results, the diminution of profits, actual losses, and a small percentage of liquidations and dissolutions. It is interesting to learn that, in a number of cases, increased wages or shorter hours were substituted for the dropped profit-bonus. In some other instances, the cause of abandonment is alleged to be the hostility of Trade Unions.

The famous Briggs scheme, a pioneer scheme in Great Britain, came to grief largely owing to the employers joining the local firms in a movement to adjust the men's wages when, after a "boom" period, prices began to fall; and owing to disputes with the men as to the legality of certain payments from the profit-fund before allocating the employees' share.

To give a brief account of this case:—In 1865, Henry

Briggs, Son & Co., Colliery Owners, of Normanton, introduced a Profit-sharing scheme with shareholding privileges, special inducement being given to the employees to become shareholders. For six years the scheme operated with a large measure of success. "In 1869 . . . one of the workmen shareholders, elected by his fellows, was given a seat as one of the board of five directors. It will be seen that the arrangements made to carry out the method of industrial partnership were in many respects singularly complete; and their effect upon the conduct of the workmen was for some time considered to be very satisfactory. A spirit of harmony between employer and employed was developed, such small disputes as arose being amicably settled without loss of time; the coal was got in a more careful manner; there was a considerable saving in timber used for props, etc. The men showed a willingness to work extra hours when this was asked of them in the interests of the business, and generally were readier to obey orders than before the introduction of Profit-sharing. The circumstances which led to the abandonment of the method of Profit-sharing were briefly as follows:—Messrs. Briggs had hoped that Profit-sharing would be accepted by their workmen as a substitute for Trade Union organization, they, on their part, abstaining from joining any combination of employers for the regulation of wages. Until the summer of 1868, the workmen seemed to enter into these views; but at that time a growing desire to join the Union began to manifest itself, on the ground that, as the company agreed to pay the average weekly wages of the district as well as a share in the profits, and as the Union tended to raise those wages, it was to the interest of the workmen to aid in that endeavour" (Report on Profit-sharing, 1912, p. 44). In 1872 the "boom" started, and the miners' wages advanced rapidly in consequence of the rise in the price of coal. At that time, the minimum rate of interest on capital to be deducted before sharing profits with the employees was increased from 10 to 15 per cent. The men, who now were joining their Union with the object of taking their part in increasing the rate of wages, were given to understand that they had to choose between Profit-sharing and Trade Unionism. One-third of them were deprived of their bonus for a few months in consequence of their giving up work for a day in defiance of the employers' commands, to attend a demonstration of the Miners' Union. The Profit-sharing scheme, however, continued to operate, more or less satisfactorily, until 1874, when a dispute concerning the use of riddles, in which the Trade Union was involved, set up hostile relations between the employers and the employees. About this time, too, the men, in common with the miners of the district, "struck" against a reduction of wages with which Messrs. Briggs were associated with the neighbouring employers. Following on the men's action the employers, upon whom pressure was brought to bear by a section of shareholders, resolved to discontinue the Profit-sharing scheme. (It was one of the defects of this scheme that the men's right to bonus was not established in a legal manner, the shareholders having the power to refuse to vote the money necessary to pay the bonus.) By this time, too, many of the men had come to wish for the abandonment of the scheme. They were suspicious and had conceived the idea that part of the bonus came out of their legitimate wages. Again, they had the following grievances, referred to previously; first, the rate of the capital's initial dividend had been increased from 10 per cent. to 15 per cent.; and secondly, before fixing a figure as the basis for sharing, the sum of £30,000, for investment in a new mine, had been taken from the annual profit. Since they were entitled to half of the profit after the preliminary dividend on capital had been met, the employees lost £15,000 through this investment while the shareholders had received new shares in respect of the purchase.

Again, it was alleged that abnormally large sums, altogether out of the usual proportion, were placed to the depreciation and reserve accounts, and that the men lost bonus also in that way. It is not here asserted, however, that Messrs. Briggs acted illegally in increasing the preliminary dividend on capital, and in making the various deductions from the profit - fund before sharing. This scheme seems to have given the firm full discretion and free prerogative to direct its operation. Thus, with mutual dissatisfaction, a promising experiment came to an end. The case became famous among students of economics both in Europe and America, and it was responsible for retarding the growth of Profit-sharing for a considerable time. Happily, the schemes subsequently introduced have been administered on saner lines; and those schemes, in which a portion of the bonus is retained for investment in capital, seem to have greater promise of permanent success than do those which pay out the whole of the bonus in cash.

Profit-sharing, to be successful, must give a sufficiently large share; the type of scheme must be suited to the business; the scheme must be administered sympathetically and in a co-operative spirit.

It seems that, with the exception of gas-works companies' schemes, Profit-sharing has made but slow progress in this country. The amount added to the wages of the participants averages about 6 per cent. The reader will have gathered, ere this, that the average workman under piece-work, or any of the premium systems, stands to obtain an increment of much more than 6 per cent. From the point of view of immediate gain, therefore, the worker will reject Profit-sharing as a substitute for a piece-wage or premium system. But there is no reason at all why Profit-sharing should not accompany one of the other systems of remuneration. Some scheme of this nature alone can give the workman that broader view, that sense of industrial co-partnership, which the usual methods, however remunerative they may be, fail to inspire.

The following general information relating to Profit-sharing schemes may be of interest.

There are about 150 schemes operating in the United Kingdom at the present time.[1] The employees concerned number 132,000, of whom not more than two-thirds participate in the bonus.

The industries in which Profit-sharing schemes prevail most are gas-works, engineering and shipbuilding trades, chemical and glass works, and mining and quarrying. In addition, the Co-operative Retail Store societies also practise Profit-sharing to the extent roughly of one-seventh of their number, and in this case, the bonus averages about 4½ per cent. of the 17,000 participants' wages. The Scottish Co-operative Wholesale Society practises Profit-sharing for the benefit of about 9000 employees, but, here, the increment to wages is not more than approximately 3 per cent. The wage-bonus and the dividend on purchase paid to members are at the same rate. It is required, however, that one-half of each worker's bonus be retained and placed to his credit in a special fund called the Bonus Loan Fund, which receives interest at the rate of 3 per cent. per annum.

There are also about 90 Productive Associations of workers, half of which distribute bonus to 7000 employees. Here the rate of bonus averages nearly 7 per cent., though in addition, in many societies, amounts are allocated to Provident Funds for the further benefit of the employees. It is characteristic of the systems under this group that the bonus is partly or wholly capitalized as shares, and thus the participants take a legitimate part in the management of the undertaking.

---

[1] *I.e.* in June 1914.

The following details of a famous American Profit-sharing scheme are quoted from *Industrial Management* (September 1917). The N. O. Nelson Manufacturing Co., Leclaire, Illinois, adopted Profit-sharing in 1886. The net profits, after interest on capital had been paid, were "divided by equal percentage on the capital and wages and salaries of employees who had worked as much as six months within the year." The employees were given the right to elect an auditor. At first, the dividend was paid in cash, the employees having the option of leaving one-half on deposit. Later, the dividend was paid in the shape of stock. In 1905 the customers were included in the scheme, "their share being based on the gross profits of their purchases," and capital's dividend was limited to 6 per cent. The scheme has yielded an average dividend to the employees of about 18 per cent. The surplus laid by is equal to about 50 per cent. of the capital; and there is a liberal rate of depreciation. The capital has risen from 100,000 dollars to 2,000,000 dollars capital and surplus. The number of employees has risen from 200 to 1000, and they now own one-third of the capital. "The plan has worked satisfactorily, has caused no trouble, and has undoubtedly increased the effectiveness and profits of the business."

Note.—The following is quoted from a letter by Mr. H. T. Manley published in the *Spectator* of April 12, 1919:—

"That co-partnership has been justified can be proved by its working in the South Metropolitan Gas Company. During the twenty-eight years that the scheme has been working the price of gas has on occasions been brought down to 1s. 1d. below the standard price; the dividend to the shareholders increased 1½ per cent., and the employees received 9¾ per cent. above the standard rate of wages. Then came the war, and a very different state of things prevails. The price of gas is up 1s. 3d. above standard price, the dividend has fallen to one-half its pre-war rate, and the employees' bonus has disappeared altogether. That, I submit, has put the scheme to the most severe test possible, and although we have received no bonus for more than a year, co-partnership is as much alive among us to-day as it ever was. I do not say that we are contented, but we are satisfied to bear our share of the adverse conditions, and to do our best to improve them, while looking forward to better times.

"Co-partnership has taught us (among other things) that the prosperity of *our* company means our prosperity."

APPENDICES

I.—WAGE SYSTEMS COMPARED.

Table I.—Earnings per Hour.

System.	Hrs. 10.	Hrs. 9.	Hrs. 8.	Hrs. 7.	Hrs. 6.	Hrs. 5.	Hrs. 4.	Hrs. 3.	Hrs. 2.	Hrs. 1.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Time-wage . . .	10·0	10·0	10·0	10·0	10·0	10·0	10·0	10·0	10·0	10·0
Halsey premium 30% .	10·0	10·3	10·7	11·3	12·0	13·0	14·5	17·0	22·0	37·0
,, ,, 50% .	10·0	10·6	11·2	12·1	13·3	15·0	17·5	21·7	30·0	55·0
Rowan premium . .	10·0	11·0	12·0	13·0	14·0	15·0	16·0	17·0	18·0	19·0
Piece-wage . . .	10·0	11·1	12·5	14·3	16·7	20·0	25·0	33·3	50·0	100·0
Ordinary differential, an example . .	10·0	11·7	13·7	16·4	20·0	25·0	32·5	45·0	70·0	145·0

Table II.—Wages Cost.

System.	Hrs. 10.	Hrs. 9.	Hrs. 8.	Hrs. 7.	Hrs. 6.	Hrs. 5.	Hrs. 4.	Hrs. 3.	Hrs. 2.	Hrs. 1.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Time-wage . . .	100	90	80	70	60	50	40	30	20	10
Halsey premium 30% .	100	93	86	79	72	65	58	51	44	37
,, ,, 50% .	100	95	90	85	80	75	70	65	60	55
Rowan premium . .	100	99	96	91	84	75	64	51	36	19
Piece-wage . . .	100	100	100	100	100	100	100	100	100	100
Ordinary differential, an example . .	100	105	110	115	120	125	130	135	140	145

Table III.—Efficiency Bonus Systems. Earnings per Hour.

	Hrs. 15.	Hrs. 14.	Hrs. 13.	Hrs. 12.	Hrs. 11.	Hrs. 10.	Hrs. 9.	Hrs. 8.	Hrs. 7.	Hrs. 6.	Hrs. 5.	Hrs. 4.	Hrs. 3.	Hrs. 2.	Hrs. 1.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d,	d.	d.
Emerson .	10·0	10·04	10·2	10·5	11·1	12·0	13·1	14·5	16·3	18·7	22·0	27·0	35·3	52·0	102·0
Knoeppel.	10·0	10·16	10·4	10·6	11·1	12·5	13·6	15·0	16·8	19·2	22·5	27·5	35·8	52·5	102·5

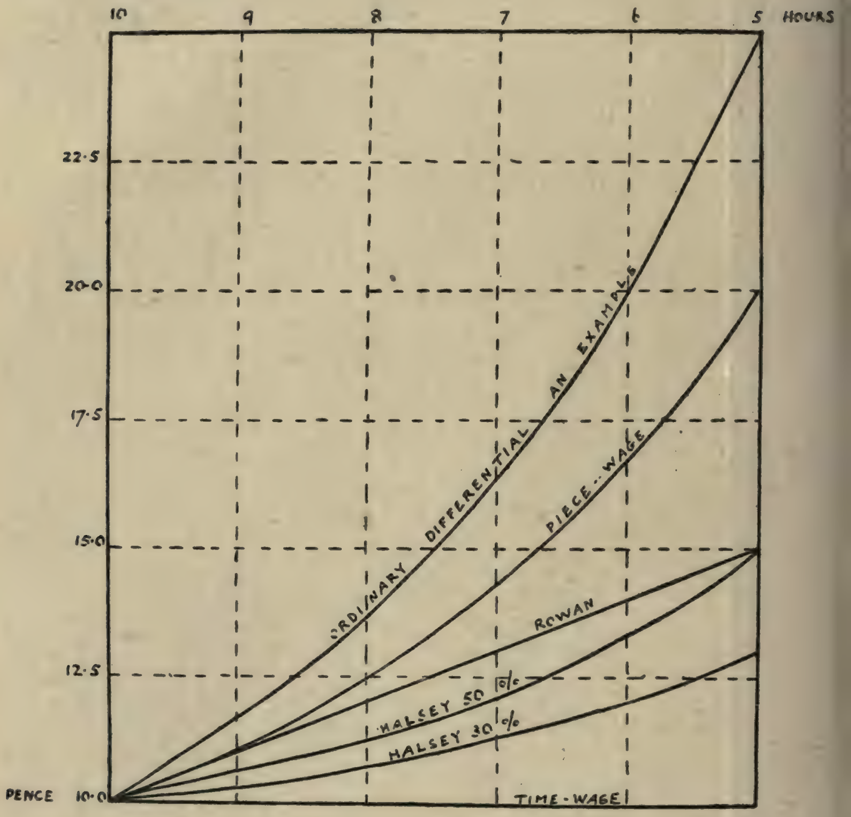
Table IV.—Efficiency Bonus Systems. Wages Cost.

	Hrs. 15.	Hrs. 14.	Hrs. 13.	Hrs. 12,	Hrs. 11.	Hrs. 10.	Hrs. 9.	Hrs. 8.	Hrs. 7.	Hrs. 6.	Hrs. 5.	Hrs. 4.	Hrs. 3.	Hrs. 2.	Hrs. 1.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Emerson .	150·0	140·6	132·6	126·2	122·0	120·0	118·0	116·0	114·0	112·0	110·0	108·0	106·0	104·0	102·0
Knoeppel.	150·0	142·2	134·8	127·4	122·0	125·0	122·4	120·0	117·6	115·0	112·5	110·0	107·5	105·0	102·5

WAGE SYSTEMS COMPARED

EARNINGS PER HOUR

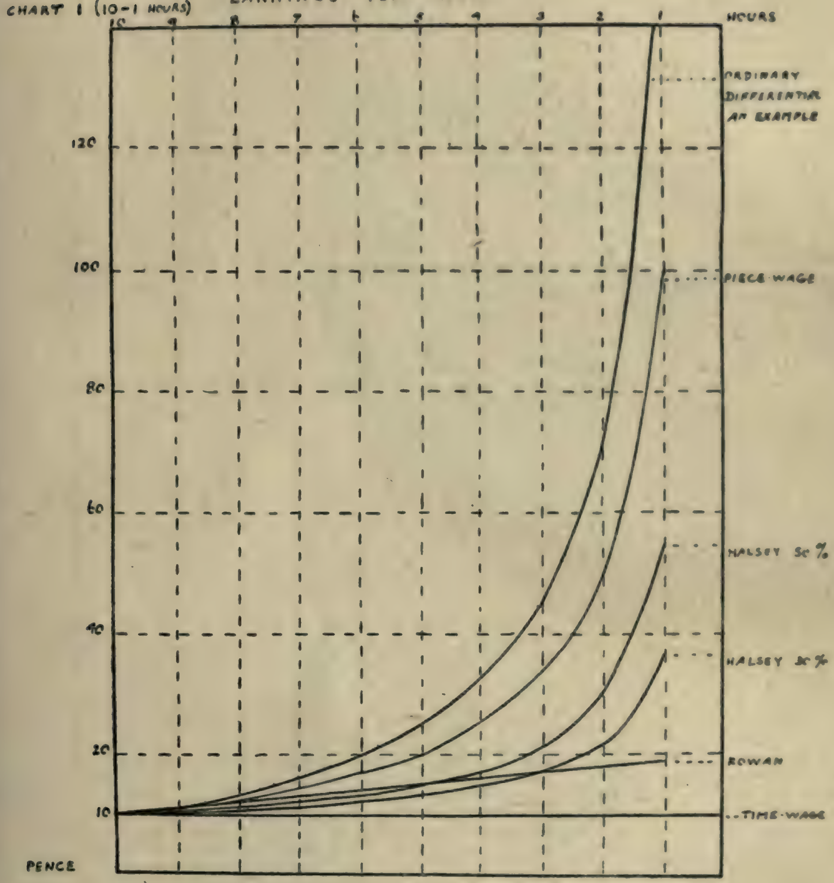
CHART 1 (10-5 HOURS)

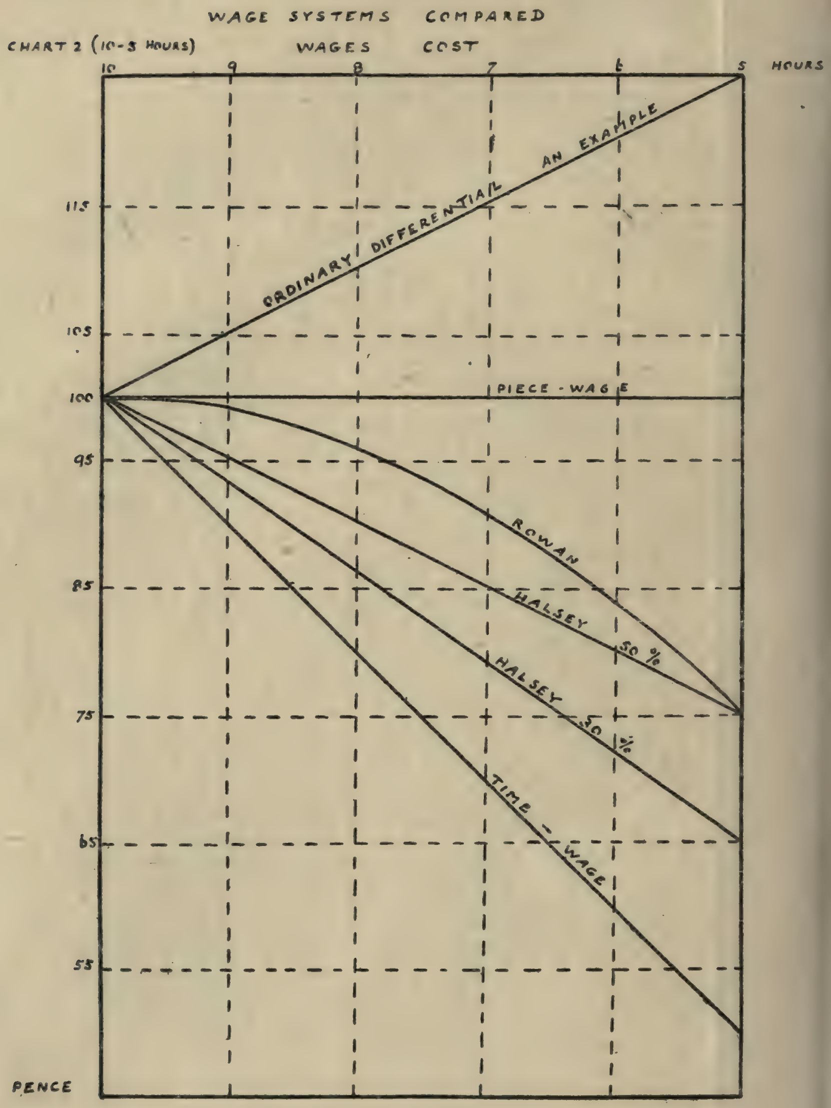


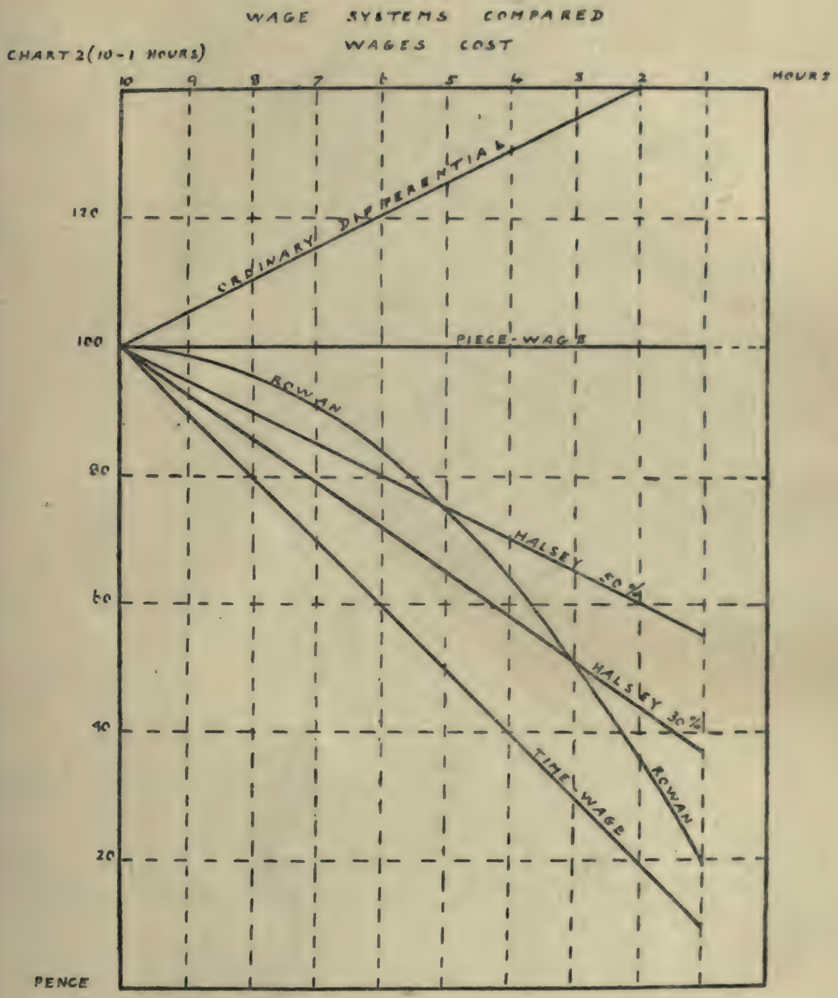
WAGE SYSTEMS COMPARED

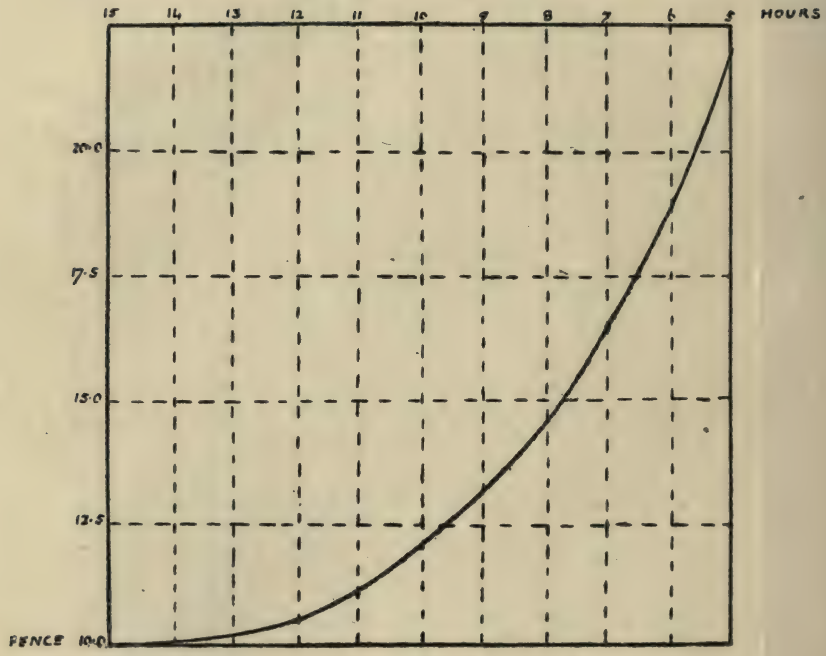
EARNINGS PER HOUR

CHART I (10-1 HOURS)




WAGE SYSTEMS COMPARED
CHART 2 (10-5 HOURS)
WAGES COST
10
9
8
7
6
5
HOURS
115
105
100
95
85
75
65
55
PENCE
ORDINARY DIFFERENTIAL AN EXAMPLE
PIECE-WAGE
ROWAN
HALSEY 50 %
HALSEY 50 %
TIME-WAGE


WAGE SYSTEMS COMPARED
WAGES COST
CHART 2 (10-1 HOURS)
10
9
8
7
6
5
4
3
2
1
HOURS
120
100
80
60
40
20
PENCE
ORDINARY DIFFERENTIAL
PIECE-WAGE
ROWAN
HALSEY 50%
HALSEY 30%
ROWAN
TIME-WAGE



EMERSON EFFICIENCY BONUS

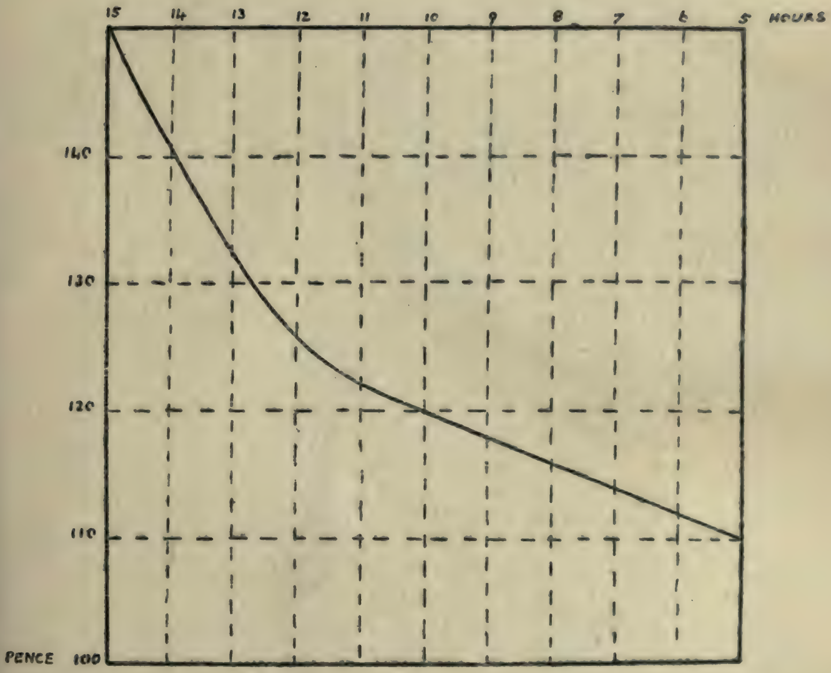
EARNINGS PER HOUR

CHART 3

EMERSON EFFICIENCY BONUS

CHART 4

WAGES COST



II.—LEVER BROTHERS, LIMITED, CO-PARTNERSHIP SCHEME

The famous experiment of Messrs. Lever Brothers Limited, of Port Sunlight, commenced to operate in 1909. The present Company was formed in 1894, with a capital of £1,500,000, taking over the business carried on by Lever Brothers and subsequently by Lever Brothers Limited. The authorized capital is now £60,000,000,[1] of which £17,230,000 has been issued. The Associated Companies are as many as ninety in number.

"After payment of all Preference and Preferred Ordinary dividends and 5 per cent. on the Ordinary shares in respect of any year further amounts available for distribution are subject to the terms of a Co-Partnership Trust Deed made in 1909 and Supplemental Deeds thereto under which employees of the Company and its Associated Companies participate on Co-Partnership Certificates held. The terms of the Deeds do not affect the rights of the Preference and Preferred Ordinary shareholders" (Prospectus, May 3rd, 1919).

The net remainder of profit available for distribution is (to quote the Board of Trade Report for 1912) "divided between the holders of ordinary shares of the company and the trustees of the Co-partnership Trust in proportion to (*a*) the total amount paid-up or credited as paid-up for the time being on the issued ordinary shares of the company and (*b*) the total nominal amount of the 'partnership certificates' then issued and outstanding, and entitled, for the time being, to participate in the distribution of dividends under the scheme."

It is noteworthy that, in addition to conditions of age and service, a participator in this scheme must undertake "not to waste time, labour, materials, or money in the discharge of his duties to the Company, but to loyally and faithfully further the interests of the Company . . . to the best of his skill and ability."

---

[1] Increased to £100,000,000 in June 1919.

The amount of Partnership Certificates granted is based on the annual salary.

There is a provision by which certificates are cancelled in the case of "neglect of duty, dishonesty, intemperance, immorality, wilful misconduct, flagrant inefficiency, disloyalty to his employers, or breach of his undertaking not to waste time, labour, materials, or money in the discharge of his duties."

In the normal way of retirement the Partnership Certificates are exchanged for Preferential Certificates which shall be "either ten times the average dividends paid in respect of the former director or employee's Partnership Certificates during the three preceding years, or the same nominal amount as that of the Partnership Certificate so exchanged, whichever shall be the lesser."

"In July 1909, 1041 employees of Lever Brothers Limited, including directors, managers, salesmen, travellers, advertising managers, clerks, workmen, labourers, and others, who had qualified under the terms of this scheme, were handed Certificates (Partnership and Preferential) of the nominal capital value of £113,650. . . ." In 1910 the total amount of Certificates (of both kinds) was raised to £214,982, in 1911 to £298,731" (Board of Trade Report).

In 1912 the amount of Certificates was £335,529, the rate of dividend on Co-partnership Certificates, 10 per cent., the amount of dividend on Co-partnership Certificates £32,279, and the number of co-partners 1906 (*Co-Partnership and Profit-Sharing,* by Mr. Aneurin Williams).

In 1918 the paid-up capital amounted to £17,065,340; the dividends to shareholders and Co-partners was £1,547,635 (Prospectus), of which over £200,000 was devoted to the payment of Co-partnership dividends.

As quoted by Mr. Aneurin Williams, the following extracts illustrate the attitude of Lord Leverhulme to the subject. The Wage System is not sufficient to maintain "individual motive, incentive and ideal . . . an active progressiveness and an ever-ready alertness."

"I cannot grant the right to demand admission to Co-partnery except on the basis of suitability and business considerations."

"The basis of success in Co-partnership means improvement in management which is going to make the variable remainder available for profits larger." . . . "This we can best do, I claim, by a system of co-partnership under which each section of the works can be represented by a committee of co-partner workmen and managers, working up then and next to a council, and finally up to the Board of Directors."

III.—PROFIT-SHARING IN THE UNITED STATES

The following information is obtained from the U.S. Department of Labour records published in 1917.

In the American schemes examined the profit-sharing arrangement is usually of a voluntary nature; the employers do not bind themselves by a permanent agreement. The participants are given a "specific proportion of the net profits or of the amount paid out in dividends to stockholders"; this proportion averages about 10 per cent. of the net profit. Or the employers may give a "rate of dividend on earnings of employees equal in whole or in part to the rate of dividend paid on capital." In the majority of plans of this kind the rate of dividend paid on the earnings of employees varies from ½ to ¾ of the rate of dividend paid to the stockholders. Frequently "divisible profits will be distributed between capital and labour in proportion as the total pay-roll is to the total capital invested, it being assumed that these two factors—total capital invested and total wages—are similar in nature, inasmuch as the former measures the interest that capital has, and the latter the interest of labour in the undertaking . . . the above-mentioned method of distribution usually results in a distribution of the profit-sharing fund in the ratio of about three to one, to capital and labour respectively."

In 90 per cent. of the schemes there is a condition of service which seeks to exclude shifting labour, confining the benefit to more or less permanent employees; and in about 12½ per cent. of the cases the participant binds himself in writing to render loyal and faithful service to his employers.

"The basis for computing individual shares . . . is the amount of earnings of the participants. The individual shares in such instances are determined by dividing the employees' part in the divisible fund by the aggregate of wages of the participants, in order to obtain what is usually called the profit-sharing dividend, and then multiply this dividend by the respective earnings of each of the participants."

In 42 profit-sharing plans examined, three-quarters paid all the benefit in cash, and half of the others paid in stock or to savings or pension funds. Where the schemes give participants stock-holding privileges, there are plans to prevent hasty or improvident disposal of stock.

Of the total number of employees in profit-sharing establishments the participants represent between 70 and 80 per cent. The profit distributed in one-third of the cases amounted to 6 per cent. of the participants' wages; in the remaining cases rather more than one-third averaged 6 per cent. to 10 per cent., and one-third received 10 per cent. or more.

INDEX

Accidents, 73.
Adverse balance, 54.
Allowance, preparation, 29.
American Machinist, 23.
American Profit-Sharing, *see* Appendix.
American Society of Mechanical Engineers, Transactions of, 28.
Apprentices, 74.
Audits, 53, 54.

Balance, adverse, 54.
Bargaining, collective, 11, 15, 18, 74.
  individual, 15.
Board of Trade (Labour Department) Report on Profit-sharing and Co-partnership, 96, 98, 99, 103.
Bonus, capitalisation of, 98, 105.
  Emerson, 78 ff., 92, 94, and Appendix.
  Gantt, 41, 63, 65, 68 ff., 79, 81, 84, 85, 91.
  Premium, *see* Halsey Premium.
  Task-with-, *see* Bonus, Gantt.
Booking, wrong, 55.
Briggs, Son & Co., Henry, 102 ff.
British Factory Administration and Accounts, 29.
Burden, expense, 23, 48, 52.

Capitalisation of bonus, 98, 105.
Carpenter, Dr., 99.
Church, Mr. A. Hamilton, 21, 40.
Clarke, Nickolls & Coombs, Ltd., 98.
Collective bargaining, 11, 15, 18, 74.
  piece-work, 17.
Contract piece-work, 26, 27, 49.
Co-operative Societies, 106.
Co-partnership, *see* Profit-sharing.
Cost premium, 46 ff., 90, 91, 94.
  standard, 46, 47, 89.
"Cutting," 15, 16, 30, 35, 53, 83.

Day-wage, 1 ff., 85, and Appendix.
Differential rate, 19, 57 ff., 66, 67, 70, 71, and Appendix.
"Driving," 26, 89.

Effort, increase of, 23.
Elbourne, Mr. E. T., 29.
Emerson Efficiency Bonus, 78 ff., 92, 94, and Appendix.
Emerson, Mr. Harrington, 78.
Engineering Magazine, 21.
Expense charge, 23, 48, 52.

Factory Costs (The Ronald Press Co., N.Y.), 56.
False time-records, 55.
Fastest time, 10.
Foremen's wages, 88 ff.
Formula, 20, 21.

Gangs, 17, 19.
Gantt Bonus, 41, 63, 65, 68 ff., 79, 81, 84, 85, 91.
  Mr. H. L., 63, 68, 69.
Gasworks, 96, 97, 99, 100, 101, 102, 105, 106, 107.
Gilbreth, Mr. F. B., 63.
Groups, 17, 19.

Halsey, Mr. F. A., 28.
  Premium, 28 ff., 60, 85, 87, 90, and Appendix.
"High and low rates," 51, 80.

Increasing skill, 74, 75.
Individual bargaining, 15.
Industrial Management, 107.
Inequality of rates, 51, 80.

Knoeppel, Mr. C. E., 85, 86, 87.
  scale, 85, 86.

Labour Department, Board of Trade, 96, 98, 99, 103.
Learners, 14, 71.
Lever Brothers Limited, *see* Appendix.
"List Percentage Plan," 56.
Livesey, Sir George, 98, 99.

Management, Scientific, 63 ff.
  preparation for, 75.
Manager, sales, 51.

Nelson Manufacturing Co., The N.O., 107.

Output, restriction of, 16.
Overtime, piece-work, 12.

Piece-wage, 8 ff., 85, 89, and Appendix.
Piece-work, collective, 17.
  contract, 26, 49.
  overtime, 12.
Planning Department, 66.
Premium Bonus, *see* Halsey Premium.
Premium, Cost, 46 ff., 90, 91, 94.
  Halsey, 28 ff., 60, 85, 87, 90, and Appendix.
  Rowan, 38 ff., 60, 85, 87, 90, and Appendix.
Preparation allowance, 29.
  for Scientific Management, 75.
Productive Associations, 106.
Profit-sharing, 95 ff., and Appendix.

Rate, differential, 19, 57 ff., 66, 67, 70, 71, and Appendix.
  standard, 6, 101.
Rate-fixing, 12, 13, 29.
Rates, high and low, 51, 80.
  inequality of, 51, 80.
"Reference rate," 34, 46.
Restriction of output, 16.
Revision of rates, 12, 13.
Rowan, Mr. David, 38.
  Premium, 38, 60, 85, 87, 90, and Appendix.

Sales manager, 51.
Schell, Mr. Edwin H., 23.
Schloss, Mr. D. F., 33, 35, 40.
Scientific management, 63 ff., 79, 85.
  preparation for, 75.
Setting-time, 29.
Share-holding, 98, 103, and Appendix.
Skill, increasing, 74, 75.
Slow work, 25.
South Metropolitan Gas Co., 99, 107.
Specifications, 19.
Spectator, 107.
Standard cost, 46, 47, 89.
  rate, 6, 101.
Stint method, 6, 7, 21.

Taylor, Dr. F. W., 57, 63, 66, 67, 68.
Taylor, M.P., Mr. T. C., 101.
Task, time-, *see* "Stint Method."
Task-with-bonus, 41, 63, 65, 68 ff., 79, 81, 84, 85, 91.
Time-task, *see* "Stint Method."
  -records, false, 55.
  -wage, 1 ff., 85, and Appendix.
Trade Unions and Trade Unionism, 73, 74, 77, 101, 102, 103, 104.

Unions, Trade, and Unionism, Trade, 73, 74, 77, 101, 102, 103, 104.
United States, Profit-sharing in, *see* Appendix.

Wage, piece-, 8 ff., 85, 89, and Appendix.
  time-, 1 ff., 85, and Appendix.
Wages, foremen's, 88 ff.
Waste, 19, 49, 58, 81, 94.
Webner, Mr. Frank E., 56.
Wrong booking, 55.

PRINTED IN GREAT BRITAIN BY NEILL AND CO., LTD., EDINBURGH.

Ec
P966p

157895

Author Prosser, J. E.

Title Place-rate, premium and bonus.

University of Toronto
Library

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET

Acme Library Card Pocket
Under Pat. "Ref. Index File"
Made by LIBRARY BUREAU